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THE LIVING WEB: YOUR SURVIVAL KIT FOR THE 1997 PC FORUM

by Esther Dyson and Jerry Michalski

Here is the site-seeing guide for your tour of the jungle. Read it now to plan ahead and come armed with questions. Take it along with you to check out the people and sites you're seeing. Look at it later to make sense of what you hear, or take issue with our conclusions.

The first section describes the morning general sessions: Short essays to introduce each module, and interviews/profiles of the speakers. The next section introduces the Pods, a new form of life descended from the Rumpus Room. And finally, we describe the afternoon company presentations: six new species and seven survivors.

Sometimes the Net looks like a garden; sometimes it looks like a jungle. Worse, sometimes it acts like a jungle, and swallows your Website whole amid the grasping vines and steamy quicksand of cyberspace.

With diligent weeding, watering, pruning, breeding and fertilizing (don't forget the power of fertilizer!), you can turn your piece of the Net into a blossoming garden. But will the garden have to be a labor of love, or are there sound, relatively predictable business models that can turn it into a profit-making venture? And where will those profits come from? Lower support costs? Stronger loyalty? Infrastructure lock-ins? New consumer behavior? Technical innovation? Global reach?

But what happens in the jungle is not just gardening; it's evolution. Organisms live and die. Successful ones reproduce and flourish; unsuccessful ones die out. There's also behavioral evolution: Successful organisms can learn from unsuccessful ones' mistakes. And as in an ecosystem, populations fluctuate; a good summer can bring out huge populations that compete for scarce food and die off in the fall. Although the jungle looks wasteful to

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WELCOME TO TUCSON!

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the human eye, it makes good use of all the resources. A dying organism's arm is often another organism's lunch.

The essence of the jungle is not just the flora and fauna within it, but the relationships among them. Likewise, the Net has its own unusual dynamics, particularly when it comes to relationships and commerce. It has started to cause radical shifts in control and ownership everywhere: between traditional companies and new Net businesses, between layers of the communication infrastructure and between industries that were comfortable tending their own gardens until everyone else showed up in their plot. It changes the balance of power between customers and merchants, employers and employees, content providers and audiences.

Worse (for some people!), the Net can turn "consumers" into small-scale producers, competing with erstwhile suppliers; employees into small businesses competing with their former employers; and passive audiences into active participants and self-appointed journalists or entertainers. The Net can obliterate what used to be economies of scale, putting businesses with legacy cost structures at considerable disadvantage. Can their good names and aggressive measures compensate for structural handicaps?

Seen through the lens of the Net, some companies' core assets suddenly seem worthless or at least endangered; other, unnoticed assets are suddenly priceless. The Net makes audience participation easier and nearly impossible to prevent, which raises interesting issues such as how to handle annoying pests: with DDT, love or praying mantises? In fact, it is hard to keep thinking of a customer base as a mass audience at all.

PC Forum 97: Metaphor makyth man

These are the questions we will elaborate at the 1997 PC (Platforms for Communication) Forum -- the 20th Annual PC Forum. We will split our time between the pragmatic issues of making a living and satisfying shareholders and the more abstract issues of how we conceptualize cyberspace and what those models, metaphors and frameworks imply. We will also consider the government's role: Should it be an active gardener, or simply provide an open field and sunshine? What is the best way to make the jungle grow without letting the predatory animals take over?

The Forum opens with a session focused on the language we use to describe cyberspace and the assumptions we hold about it, including fundamental issues such as what success means in the new medium. If our measures of success make us pay attention to industries or companies that may be far less relevant in the future, we may miss the emergence of useful businesses around and in between them. What looks like weeds may well be the stuff of tomorrow's food chain.

MONDAY

METAPHOR MADNESS

Lucky thing humans are incredibly adaptable. Otherwise, we'd never get anything done -- or we would go crazy trying to resolve inconsistencies in the language we use, get past ill-disguised problems in user-interface design and deal with the growing barrage of information available for digestion.

Humans don't naturally enjoy chaotic situations. One strategy we use to deal with chaos is to find something comfortable -- quickly -- and cling to it. That describes many companies' and individuals' early responses to the opportunities (and confusion) of the Net. One of our favorites is the rate card, which gives a false sense of security: If we can count how many people will see an online ad and price it, we must understand the medium.

(We have designed a part of the Forum Website to illustrate a variety of metaphors that have emerged to describe cyberspace; see page 37.)

It's already cliche to say that the Net creates vast opportunities and will change the world. This Forum's sessions are designed to dig deeper into those issues, to scratch around in the garden soil enough to find some diamonds. Along the way, we encourage you to pay attention to the language used to describe the artifacts and dynamics surrounding the living Web.

The words we use deeply influence our perceptions of the things that surround us and our relationship to them. If you think of the Net as an ocean (remember Bob Kavner's story of how Robin Williams would guide us through the Net?), you have completely different expectations than if you think of it as a stage, a set of TV channels or a comfy living room.

The Web morphs to please; it can take on many different faces. Are some of those characterizations more useful than others? The people most embroiled in this and related issues are Website and online-service designers, some of whom are creating new ways to conceptualize the medium. Two of them are on this panel. Hold onto your hats, we're in for a wild ride... or is it a dive? or a dig?

George Lakoff: Cyberself -- the Internet's metaphor for us

In 1980, linguistics professor George Lakoff and philosophy professor Mark Johnson co-authored a book that showed that most abstract thought is metaphorical, using concrete ideas to reason about less concrete ones, usually unconsciously. They didn't suspect that the book, **Metaphors We Live By**, would strongly influence their peers and become a cult classic among people well outside their fields.

Surprisingly, **Metaphors** was the first organized exploration of how metaphors affect world view; it touched off other research in the field and gave their readers a new way to peer into their own unconscious thought processes.

Don't do that!

Last year, Lakoff published **Moral Politics: What Conservatives Know that Liberals Don't**, which was the first full-scale application of cognitive science to politics, showing how fundamental political ideologies grow out of the Nation as Family metaphor, with differing models of the family.

Conservatives, Lakoff argues, see the government as a Strict Father who ought to reward discipline and self-reliance, punish misbehavior and otherwise doesn't meddle. Liberals see the government as a Nurturing Parent whose job is to nurture and protect, and foster community responsibility. The analysis explains why each side sees the other as irrational and why liberal and conservative views on issues cluster as they do.

Of course, people see their employers, churches and other authority figures through the same lens as government. Some companies are nurturing; others stress discipline and competition.

Recently, Lakoff has become interested in the Internet's metaphors for us -- what view of the self computer technology creates for us. Consider, for example, the Self as Information Manager in all aspects of life: time schedules, mail and e-mail, finances, HMOs, relationships, vacations, homes, helpers and commitments, not to mention jobs. (How many messages are in *your* e-mail inbox; who's taking Zoe to soccer? When's your next "free" time?)

Roger Black: Distinctive marks

Few people have had more influence on the presentation of print media over the past decade than Roger Black, who made his early mark as the art director of the New York Times and Rolling Stone magazine. Black later led the redesigns of Newsweek, Premiere and the Baltimore Sun, as well as the launches of Out, Fast Company and Smart Money. Now, as president of the Interactive Bureau (IAB) and creative director of @Home, Black is busy making his presence felt online.

Typography is Black's center. His signature is the use of black and red to create bold titles in memorable typefaces. He co-founded The Font Bureau in 1989 and Interactive Bureau in 1994. The latter company's first major project was the design of Discovery Channel Online. IAB is a design consultancy that is making its way into the content business, but through business partnerships rather than as a media company.

Over the past few years, Black created a global network of affiliated design firms, called the Media Design Network. It includes Danilo Black in Monterrey, Mexico; Feriche Black in Barcelona; and WB Associees in Paris. Joint ventures with these firms have created Interactive Bureaus in France, Spain and Mexico.

All told, Black is now involved in 11 joint ventures. His interest is not in managing them, but rather in working with and within them to develop the business models he envisions -- models congruent with where he believes technology and culture are headed. This involves mixing some orthodox beliefs about design, content and advertising with a sharp dose of reader/viewer/member participation and autonomy -- not standard fare in the publishing or design worlds -- and an even larger dose of inside-out scale. More on the inside-out scale in a moment.

Black's current project is a Website designed to sell a product normally sold by mail. It will combine some notions from direct marketing with value that clearinghouses can't add, such as personal Web pages, editorially driven community activities, links to people and more. The site will have standalone content in a transaction-oriented environment. "People always welcome advertising of products that they're interested in," says Black, who believes that tailoring is key, which makes good customer profiles a big asset. To create the site, IAB is working with technologically astute marketing firms as well as providers of scalable profile management, customization and analysis systems.

Small is big

Tailored content isn't all that novel, but Black's insights about mass media and mass culture offer good reasons why large media companies may be in trouble. In essence, Black believes that the world gets more granular as people get hooked up -- and not just online. He points to trends in popular culture, especially music and fashion, where big is out. "Big music is in trouble because the world is more complex and pluralistic than they can handle," says Black. "Megagroups are no longer happening. But music isn't dead, it's just changing. All you have to do is hang out in New York, San Francisco or Austin to know that it's vibrant. It's just not universal anymore. The big studios hope they can turn some kids into stars, but that's not working."

Black believes the same holds in fashion, where the big houses are straining because all the good ideas come from the street, and the couture houses' business ties keep them from covering things that local. Making the point, he notes, "When did the baseball hat go out? Details or Vogue won't tell you, because they're not watching. They're beholden to advertisers who are totally out of touch."

Make it small

The key is to go inside-out, to go local -- to satisfy audiences so small that they don't interest media houses, then clone it, link it, keep it going. It's also important to create an environment that allows these groups to garden themselves. Black's inspirations are the collectively created, small-circulation publications of the '60s, plus the dynamics of the Internet. He says, "The underground press of 30 years ago is more like the origins of the Net as a community-based thing than traditional media. It's narrowcasting or niche content," but created by the communities themselves.

If the inside-out model works, it will probably change the way advertisers advertise and publishers publish. "Scale is in everyone's way," says Black. "It's hard for anyone in the media to get it. They're missing the point because they demand certain sizes of returns. The only big company that understands some of this is AOL. Nobody knows that AOL 'gets it' far more than the people at Time/Warner, Virgin or Disney."

Black is also concerned that publishers keep creating traditional media products. "Even HotWired is building these slick, monolithic interfaces that don't let you see who is there," he says. "I don't understand why. How about a transparent Website that lets you see through the site to the people who run it?" Black points to City TV in Toronto as an example of the style that's needed.

Black's thoughts on scale and interest may well constitute a deconstruction of traditional media. As he turns out projects based on these beliefs over the next few years, we will have a chance to evaluate them.

Kyle Shannon: A new vocabulary

Last summer, Kyle Shannon noticed a strange kind of complacency creeping into the Web-design industry and into the jobs he and his colleagues were pitching. (Shannon runs the creative side of Agency.com, one of New York's first and hottest Web development houses.) It seemed that the business had quickly settled into a few models, most of which were invented in 1995. Projects were getting predictable; the innovation was drying up. How was this possible in an industry that was just over a year old?

To Shannon, the common language that describes Web stuff was a major contributor to the shift in attitude. Something disturbed him about the static, published nature of Web "pages" and the Orwellian sound of a "user." Brainstorming sessions brought him to a new set of words that allowed him to conceive his projects differently. More importantly, the new language naturally drew his clients into a different relationship with their customers.

"Compare 'designing a page for a user' with 'creating an event for a participant.' You imagine radically different things. If you then think of a company's Web presence as a venue that holds all of these potential events, you can't help but get excited. Imagine if every person coming to your site had the opportunity to truly interact with your company, and doing so proved relevant to their life. Wouldn't that just rock?"

"If you extend the metaphor and imagine a true venue, there will be various roles at the events. Some people are on stage or somehow in the center of attention; others watch, and maybe talk among themselves," he says. This model makes room for a wide variety of activities and relationships. It brings the client company into the center of the space. It makes one-to-one marketing a participant's expectation rather than a utopian marketing dream.

It all started in a 500-Watt radio station...

Two years ago, Shannon was an underemployed actor with an ad agency day job who posted regularly on Echo, the New York City online community run by Stacy Horn (see **Release 1.0**, 6-93). Intrigued by a buzz emerging on Echo, he began to explore the Net and was compelled to try the Web. It seemed too good to be true, but he discovered he could put his creative work "out there" for little to no cost. He and his wife Gabrielle created a Web zine called "Urban Desires" in August 1994. Desires attracted considerable international attention.

Amazed at the pace of Web change, Shannon figured it would be easier to know what was happening if a group of Website developers shared their insights. Besides, it could be fun, too. Thus started the World Wide Web Artists Consortium (WWWAC) that October. The WWWAC now numbers over 2000 members and features a frothy mailing list where members kick around topics from how to place images precisely, to what people think of a new piece of software and where the industry is headed.

Shannon met his co-founder, Chan Suh, then Vibe magazine's online publisher, on Echo and invited him to the first WWWAC meeting. They decided to start a venture together and founded Agency.com that December. Suh runs the business side. The company has grown to over 70 employees; its clients include American Express, British Airways, Claris, GTE, MetLife, Hitachi, Lucent Technologies, Sun Microsystems and The Artist Formerly Known as Prince.

Shannon's background is in the theater. He founded and ran a New York theater company, played token roles in TV and film, and wrote seven feature-length screenplays -- but he really wants to direct. And that's pretty much what he's doing now, on the world's largest stage.

CONTENT AND ATTENTION

Some years back (PC Forum 1993) we said that content is key. Now we'd like to amend that: *Attention* *is key... and one very good way to get it is through content. (See also Michael Goldhaber's essay in* *Release 1.0**, 3-92, and his forthcoming book, "The Attention Economy.")*

But content *consumes* attention. Attention is in short supply, while content is increasingly in surplus. In order to clear the market, it requires more and more content of higher and higher quality (however that is measured!) to attract a given amount of attention.

The big question for business on the Net is how to turn content into attention, and attention into money. What is the rate of exchange between content and attention, and between attention and money? For a while, we've had a sort of protected currency, where companies want attention without trying to convert it back into dollars. (Or perhaps they're expecting the conversion rate to change?)

You can't easily measure the quality of content, but you can measure other factors: The cost to create content, which is then divided by an almost costless profusion of copies. The quality and intensity of attention can't be measured either, but attention is used up per person, over time. (Its value is also indicated by the premium people are willing to pay for products or services they know -- that is, to which they have paid attention in the past.)

Any Net company's goal is to use content to attract attention. In the past, you could get attention more easily by owning a distribution channel or paying the high costs of delivering content though a printing press, paper, the US mail. Later, people started sending materials by Federal Express, a very expensive channel, just to get attention.

Now, content distribution channels have more value, because there is so much noise, and less, because they have so much more competition. The attention the television networks built up is gradually eroding, both to competition and to new technology. The remote control alone has seriously eroded the value of the "hammock position" between two top-rated shows in prime time.

Attention generates value and ultimately revenues, whether it's in the form of a brand reputation in millions of consumers' heads, or their knowledge of how to use your product, their familiarity with the particular taste of your soft drink or their trust in the humble face of your star consultant as seen on millions of book covers, posters and business television shows. Each of these will generate revenues.

Two companies are now facing this challenge in their own ways: America Online, which has gotten a lot of negative attention lately, and Bloomberg, which charges for its information in a traditional way, but now also has a variety of advertiser-sponsored services such as Bloomberg Television and the Bloomberg magazines. Bloomberg helped restructure the financial information business, and now there's another restructuring coming as information becomes cheaper and cheaper to find and distribute.

Both are moving from closed, proprietary models to more open ones. It is easier to attract attention when you are out where you can be seen, and where people (figuratively) do not need to make a special trip to see you. Closed systems are like those promotional events on yachts, where you become a captive audience. (Or conferences in the desert, where there aren't a lot of other options? People have to really like what you have to offer to come in the first place.)

The real mystery is how audiences will behave. Will they watch passively? Will they select once and be content to receive pushed material thereafter? Or will they demand attention for themselves, attention that can only be supplied by other people, whether community members or service employees?

More alarming -- to a traditional content provider -- is whether audiences will remain audiences. A big unexpected source of advertising -- or at least free content -- will be people advertising *them*selves. It begins with the kid's own Web page. Then he spends his allowance on banner ads; he pays his friends to link to his home page...

Michael Bloomberg: Blooming brilliance

Michael Bloomberg gets tetchy even at the mention of the word "open," because people always use it to describe whatever it is *they* are selling. As far as he's concerned, it's analysts and industry watchers, not customers, who are obsessed with the concept. But he's responding to the market, and gradually converting his world-famous Bloomberg terminals into an optional PC/Internet-based version: "If they want open systems, we got 'em in spades." Yet, he insists, "The need for these open systems is dramatically over-hyped. Once they call up our pages they never go anywhere else. They don't need to go anywhere else. They claim they have Internet connections, but you ask them to get on the Web, and they don't know how."

Of course, he says, "If you have Reuters or Telerate, you do want open: You want to combine it with additional things because they don't offer very much." Nonetheless, he acknowledges that world is changing: Although only 10 percent of the installed base is "open," 50 percent of new customers in the last couple of months have taken the open option. Whatever he says, he knows enough to give customers what they want.

To questions about strategy, he barks, "I don't have a strategy for four or three years out; I need a strategy for next week!" Yet in a world where people with "strategy" often fall flat on their face, Bloomberg's instincts seem to be serving him remarkably well.

Still, Bloomberg is moving from a sure thing into a different, more mass market of upscale people in general. His basic business is adding 100 mostly securities-industry customers a day at $13,000 per head per year; it's a small, highly profitable market in which Bloomberg is gaining share. Total revenues are over $1 billion annually, whereas the other ventures are costing considerably more than the $20 million in advertising revenues they generated last year -- and probably more than the $30 to $40 million they'll generate *this* year.

Bloomberg Magazine should hit 200,000 subscribers shortly. Bloomberg Television goes head to head with CNN & CNBC in the US, and often wins its timeslot, says Bloomberg. The brand has been established.

One challenge is that right now advertisers pay for ratings, not for quality, Bloomberg notes. "Advertisers don't pay any more per upscale viewer than they would for a general television audience; the difference is that only *we* get the ads from Mercedes. Demographics is certainly something to pay lip service to, but in the end the amount of money you can charge is still proportional to the raw ratings.

"Anyone whose business model says they're going to make money on advertising on the Web is in trouble," says Bloomberg. "There's so much of it. Customers will blur it out. They'll get tools to zap it. But rest assured: We will have the world's greatest Website. I don't think it's valuable, but we'll do it."

So what's the strategy? Is the game what it appears to be in the software industry nowadays? Gain attention (i.e., market share) through content and then sell not the content but the content-creating machine -- the company itself? Of course, even if Bloomberg knew, it's unlikely he'd tell us.

Steve Case: Message makyth man

Steve Case sees himself in a world where the barriers to entry for creating content are so low that there's "a glut of choices, Websites, hundreds of thousands of choices -- some good, most not." Now you need to get attention *for* your content in ways external to the content itself: "The consumer dynamic shifts to a desire to have it packaged and selected so it's more likely to meet their needs. Diversity is good but complexity is bad, in terms of building a consumer mass market. Thousands of companies were started on the naive notion that if they built a Website millions would come. But they're like trees falling in a forest: No one knows it's there.

"The content game is tricky. It's increasingly tough without a distribution partner. Venture capitalists are reluctant to fund content ventures that don't have that kind of sponsorship." Of course, we argue, the power of the "distribution partner" will diminish over time as open systems comes to mean something broader than just technical openness: The push tools offer do-it-yourself service builders. They deliver to the user, but the user first specifies what he wants pushed to himself regularly.

Case vigorously disagrees. "The power of distribution partners will not diminish irrespective of push or pull. Either way, distribution partners will make the users' choices visible to them. They aggregate the content on the one side and the audiences on the other," he says. "It's all about audience reach and frequency. You need to figure out a cost-effective way of building an audience, which is partnering with someone like an AOL. The Net will not be another version of television; it will be more about mass customization. I think of AOL as a true cumulative market of niches, clustering together lots of services under one brand."

AOL provides that in its chat rooms -- which AOL earlier this month announced will accept advertising. Advertising rates will be based on ratings. "It's about reach and frequency," Case says, "less about segments."

Here's a fundamental question: Is the value in the structure, the community itself and the framework (AOL) that supports it, or is it in the particular people *in* the community? In other words, can you replicate communities easily, or are they a function of the particular members? Are the communities Bloomberg is building worth more than the masses AOL collects?

Of course, the answer is again both, but the elitist view is that if you have the best, say, Bulgarian wine steward, you have a monopoly, however small it may be. The other view says that you can start a second one that can be just as good as the first, as long as the market is there.

Case tends to the second view: The critical mass counts more than the host, but they both create value. The content is the membership, not the leadership. The result is a concentration of rewards around a brand name.

"Community leaders are important but not irreplaceable. We create the overall atmosphere and content. We send them to certain places. No question that the difference between a good discussion and great one is a function of the particular people in charge." One example he cites is Net Girl, a love-interest service whose host left last year. "Net Girl has continued to flourish since that particular person left. We do welcome and embrace these hosts, but the participants are the center of gravity."

The second view is that the rewards flow to a couple of individuals who can support the best community in any particular field. They have a monopoly of the same variety as a copyright holder, except that the value is in somebody's head -- and it can't be replicated.

Of course, in either case, AOL could win -- either by building its brand name, or by figuring out how to attract the very best community leaders in any particular field. The distinction is subtle, but it's real.

As for openness, Case says, "We're doing it. It's no longer AOL versus the Internet; for 8 million people, AOL is the Internet. This is about embracing and extending, not replacing something. It's akin to if Apple 10 years ago had licensed Windows and Intel and built the easiest-to-use system, and then added some Mac technology on top of it. It would be a different world."

Dinner speech -- Michael Crichton: Nothing but a man

It takes a certain amount of knowledge to despise technology without sounding like a Luddite, and that is what Michael Crichton can do. He's been there, done that, with the best of them. We first heard of him as a former Harvard Crimson editor who had gone to medical school and achieved success with a popular novel, "The Andromeda Strain." For those of us on the Crimson, he was our Bill Gates, one of our own who had gone on to great success outside our community. We were proud of him among strangers, derisive among friends, and secretly we all envied him.

"The Andromeda Strain" was just the first of many successes for Crichton. From those days, he moved on to greater and greater things outside our world, most recently as the author of "Jurassic Park," "Disclosure" and "Airframe," and as the creator and co-executive producer of NBC's ratings-leading drama, "E.R."

But he also was the first person to include digitized film in a commercial movie, Westworld, in 1973. Later in the Seventies (about the time PC Forum started), he designed a scheduling and film-production software package on a 96K IBM Series/1. "It included extra memory, a monster in its day," he recalls. And he is fully wired now, with a PC and e-mail, and wondering how he could operate without them.

Yet he abhors the pace they have brought, and wonders if cyberspace is any place to bring up children. Indeed, many of his works have been about excesses in the adoption of modernity, whether it's cloning, the sort of sexual PC-ness limned in Disclosure or the pressures of commerce against safety in Airframe.

"We're being seduced into imagining the world is changing in a way it hasn't changed," he says. "The gestation period for a child hasn't changed. Their need for attention hasn't changed." He has an eight-year-old daughter, and so he knows: "Her friends, they lack adult attention, instruction. They don't get told how to behave... These kids that are shooting people. I think drugs are related, too. All these things happen where you don't have the adults there."

"We can't see it because we're all in it all the time. How can you assess it unless you stop it?" he asks rhetorically. And so rather than warn of dangers, he makes them seem real. From medicine to cloning to the work of the Santa Fe Institute, he has taken weird science and put it into human terms. If he has a mission now, it is children, education and the need to remember we run on chemistry, not electricity.

TUESDAY

SOCIAL INFRASTRUCTURE

Does the Net foster inequality or equality? It's a powerful tool for either.

All by itself, it's one more thing the haves can have. But *with* some effort -- education, training and use in the workplace -- it's a powerful tool for upward mobility and equalization. It lets the ignorant learn, the distant come close, the idle be productive. Much as Carnegie changed the lives of many self-improving individuals in the US with his system of free libraries, so could someone (or some organization?) do the same with the Internet.

There's general agreement with the sentiments above (although some reservations if it takes resources away from teachers). So why is it not happening? Because the consensus is for the results, not for how to achieve them. Should we simply go dig up Carnegie, clone him and ask him to fund universal Internet access? Should we complain that Bill Gates isn't pulling his weight? Should we ask the government to do it for us? Or should we, finally, look to ourselves?

Reed Hundt: A teacher at heart

Reed Hundt taught in an inner-city school in Philadelphia for two years after graduating from Yale in 1969; he is hardly naive about the realities of life in grade school. After three years as chairman of the Federal Communications Commission, he is hardly naive about Washington. But is he naive about business's willingness to pitch in for education?

Certainly his goals are admirable. He wants the Internet in schools -- and not just for children, but as a way of empowering teachers and opening up communication between teachers and parents: "There are lots of parents who may not have Internet access at home, but who could log on from work during lunchtime, for example, to find out what's going on at school and talk to their kids' teachers. That's the sort of benefit companies could easily offer, and everyone would gain."

In some sense, Hundt is not naive at all. He understands that if he wants business's help, he needs some power to regulate them, and that is exactly what the FCC has. Yet the unwise exercise of that power contradicts Hundt's other goal, which is deregulation.

The Commission's plan -- to be voted on May 8 -- would require Internet service providers to offer discounts to libraries and schools. The government will reimburse them for up to $2.25 billion yearly. "By bringing the Internet to schools we will not only revolutionize education, we will stimulate the expansion of advanced networks to every corner of America. The money we spend in connecting the schools, like the GI Bill and the Marshall Plan, will be repaid many times over in the benefits this effort brings." But although most people approve this initiative's goals, they question the means -- as Bob Metcalfe does below (page 14) -- which would require some oversight of the ISP's costs.

On the other hand, the FCC has won ringing approval from the Internet community by refusing for now to require the Internet providers to pay access fees to local phone companies. "Clearly, we need to fix the access-charge system," Hundt acknowledges. Today, those access charges aren't truly competitive. But we have surprisingly little information about some critical empirical questions. Exactly what are the costs of network upgrades to support the growth of Internet services? How would different pricing regimes -- for example, charging some usage-sensitive rate to ISPs -- affect Internet usage patterns? How much overall revenue do local exchange carriers derive from Internet usage, when you factor in things like second-line growth?

"As a former litigator, I find this perpetually frustrating. In litigation, if you need a piece of information you subpoena it, or depose someone under oath. At the FCC, it seems we're always being told, 'That's confidential information; we can't tell you.' Or different parties tell us completely contradictory things -- not under oath, I notice."

John Doerr: New game, same approach

John Doerr began life as a energetic salesman for Intel, continued as an enthusiastic VC helping to create the industry through Compaq, Lotus, Sun, Symantec, Netscape, Intuit, Macromedia, Amazon.com, @Home and Millennium (a genomics company). Now he is applying his energy to learning the political game as he attempts to flatten the landscape on which the industry is competing. His first large-scale political effort helped lead to the defeat of California's Proposition 211 -- in practical terms, the bill that would have made it even easier for shareholders (and their hungry lawyers) to sue when they lost money on an investment. The teamwork on Proposition 211 led to a nationwide net of politically active technology executives and supporters.

Now Doerr is concerned with education: Call it the longest-term investment around -- and one where a whole country will reap the benefits. With that problem at least temporarily out of the way, the informal group that helped defeat Proposition 211 has turned its attention to education reform. Even as a business issue, it is vitally important, although in a slower, less visible way than Proposition 211.

Here's the question: If you can't take it with you, how can you best leave it behind? Doerr learned some of his respect from personal experience, as one of five children. He recalls, "My parents always said, 'We'll get you a good education and no one can take it away.'" Doerr made good use of his, earning a masters degree in computer science and engineering from Rice University.

He recalls his days as a budding venture capitalist, when he hung around the second floor of Margaret Jacks Hall, the computer science building at Stanford. "You could walk from cubicle to cubicle, from Andy Bechtolsheim to Jerry Kaplan, from Forrest Basket to Jim Clark and John Hennessey...." Collectively, they founded Sun, Silicon Graphics, Netscape, Healtheon, GO, OnSale and MIPS, among others.

Now he's concerned about the schools that are feeding these universities. "All the excitement over NetDay," Doerr notes, "merely strengthened my understanding of the home-school connection, versus the Internet connections.

John Gage [of Sun] is a hero for organizing NetDay, but it's only one step." [He asks us to note: The next NetDay is April 19, except for April 12 in California; details at http://www.netday.org.]

"There's no silver bullet," he continues with fervor. "When 40 percent of eight-year-olds can't read, it isn't a problem of lack of the Internet; it's something more fundamental. It's not the teachers or the parents or even the unions. It's the rotten, crummy system! The incentives are all wrong, and no single effort can break us out of it. Once we lose these kids they're gone forever.

"The best thing about NetDay is that it got a bunch of parents into the schools. Many of them are technology leaders, and many have kids in public schools. We're going to have to overturn some rice bowls -- bureaucracies, school boards, unions -- but there are more bureaucrats than voters. Our goal is 3000 charter [state-funded but independently managed] schools by 2000. We have to tackle it on a state-by-state basis."

"I haven't met a politician yet who doesn't support education," Doerr says with his usual earnest urgency. "I'd like to tell them I believe government's good, but we need a balance between local control, state initiatives and national standards. Money is not the core of the problem. We don't honor our teachers. The principals control less than 2 percent of their budgets; they can't hire and fire the staff. Local schools boards are too meddlesome. We need to stop dictating process and worry about outcomes."

To what extent is the Internet relevant, beyond focusing attention on education overall? He sees it as not just a library, but as a communications tool, a great equalizer. It can help make home-school connections, and it can also let teachers build communities among themselves. It could cause the same kind of consumer consciousness the Net has sparked in other marketplaces. Suppose we started rating schools on the Net? Or even teachers????

Bob Metcalfe: Market makyth man

The Forum won't be the first time Bob Metcalfe hears Reed Hundt -- and here he'll have a chance to answer. The last time, at the ACM anniversary conference, New York Times columnist Denise Caruso was watching and noticed Metcalfe, a die-hard free-marketeer, smiling and nodding in the audience as Hundt talked about the need for telco deregulation and for the Net in schools. Caruso leaned over and whispered, "Doesn't he make you want to be a Democrat?"

"Well," Metcalfe whispered back, "almost!"

Their goals are similar, but Metcalfe vigorously deplores what he calls "this bear hug -- this dragging of the ISPs under universal service." His conspiracy theory goes as follows:

"That whole regulatory regime doesn't want to change. They wouldn't know what to do if it got competitive. There's high stakes and all those lawyers. 'So how do we rein it in?' they ask themselves. 'Under what pretext do we do that? Hey, schools and libraries!' It'll be a new S&L debacle. You see, they want to regulate the Internet, and what better way could there be than entangling it in the Universal Service rules in the name of schools and libraries?"

Previously known as the inventor of Ethernet and founder of Candlestick, Metcalfe is known to a newer generation as a weekly columnist for InfoWorld, and as vp technology with its parent IDG. Actually, he and his wife Robyn Shotwell raise rare livestock in Maine, but Metcalfe weighs in weekly on topics of concern. Because of his technical background and his articulateness, his opinions carry great weight. His most recent shtick has been the bogging-down and frequent collapsing of the Internet: The fact that it hasn't yet suffered a gigalapse, many argue, proves that his warnings have had an effect.

In fact, we'd argue, the free market is indeed working, and new capacity is lumbering into place, awkwardly, to meet ever-increasing demand. His concern is that this process may be hampered if the Internet comes under government regulation.

"If the Net comes under Universal Service rules, then it has to be regulated. Bureaucrats will have to pick through ISP costs, and drag them into that whole game of monopoly, with the public utility commissions approving their prices and that whole deadening anti-competitive game. One of many reasons we don't have high-speed digital service is that the PUCs had to be convinced rate-payers weren't being ripped off by this crazy adventure called ISDN. Now we're not getting ADSL [Asymmetric Digital Subscriber Line] for the same reason."

"If you want schools and libraries to get on the Internet, give them the money to buy it in the open market. The FCC's latest proposed ruling would force ISPs to give discounts to schools ranging from 10 to 90 percent. How do we tell how much of a discount a school needs? Look at its participation in the Federal school lunch program. We're going to entangle ISPs in the regulatory jungle. If they discount off X price, somebody would need to say whether that's a 'fair' price in the first place. And the small ISPs just can't afford the overhead of all that paperwork.

"It's a big mistake to upgrade Universal Service to the Internet. Keep the definition of universal service down at POTS [plain old telephone service] and let it wither away in competition with Internet telephony. Universal Service is a code word for all that old law, PUCS and all that baggage.

"I'm not concerned about content control; it's competition I'm worried about. Having a regulated monopoly doesn't work well. Silicon Valley is running around saying where's all the bandwidth we need. And the telcos are sitting around...well, they're just sitting around."

BUSINESS MODELS

It's foolish to try to figure out *the* *business model for the Net, just as there's no single model for a successful animal or plant.*

However, there are two main ways to survive long-term: Create value (get food). And cut costs -- your own or someone else's (keep that metabolism down). Of course, any strategy is a combination of both, and there are other things you need to do to make them work. For example, you need to get attention in order to find customers and generate revenues from the value or cost-cutting capabilities you have developed. It's instructive to look at each of our panelists in this context. And it might help explain why content on the Net is not in itself a huge source of incremental revenues.

Indeed, while Monday's "business" panel focused on content and attention, we still think that most of the money from the Net won't in fact come from incremental content revenues, but rather from delivering traditional services more efficiently and from better customer service. Attention is just a means of establishing your identity in the food chain.

Netscape first created some value in order to get attention. Now its strategy is to build tools that will help its customers cut costs -- operate more efficiently and effectively -- both in Net commerce and in their own operations.

Amazon.com, for its part, does not generate much extra value (other than what the convenience may add to overall book sales), but rather makes the business of buying and selling books more efficient and effective. Its profits come from the gap between its revenues and lower costs, by leaving out the middlemen, the inventory and the time lag of traditional distribution channels. And it can afford to do so because it has no barriers to exit from an existing business, as other booksellers do. And unlike book distributors, it has no retailers to alienate. Amazon pretty quickly discovered the possibility of synergy with small operators who were creating content value by providing an editorial context for the books Amazon is selling. Now it is cutting costs for some 7000 Associates, Websites who get a commission for sending customers to Amazon to buy books.

By contrast, Citibank's value is trust, not products. It has a worldwide presence and a worldwide perspective, and wants to prosper in an increasingly worldwide marketplace for banking defined as more than just financial transactions. Everyone, of course, is after the consumer's trust, but the banks know just how costly it is to build and maintain. But Citibank also cuts costs, and that will remain one of its core competencies.

Steve Rattner watches all this from his perch at Lazard Freres, where he makes some of it happen and keeps track of it all.

Jim Barksdale: Open is as open does

"I look at our business and the industry as a book, a very long book," drawls Jim Barksdale, ceo of Netscape. "If the book is 1000 pages, we're at 50 to 75. Every page you turn, you learn something new. Of course, that's not true of all books...."

He continues, "We certainly are no longer a small startup with nothing to lose; we're a public company. But we're in unusual circumstances just due to our age. We're only three years old next month. We're still a startup in many ways. That creates an awful lot of strain that would not be normal in a 10-year-old company that had been public three years."

"I'm proud of that," says Barksdale. "We've solved all the classic problems as a very young company: What's your market, what'll you focus on, what'll you not do? Budgets, headcount... all those things." Of course, both Jims -- founder Jim Clark and ceo Barksdale -- have done it before.

The market is changing so rapidly that you need to be as creative with business models as you are with products and services. Netscape's strategy seems to change as frequently as its products.

"Our strategy has become more defined. Our tactics have changed," says Barksdale. "The strategy on a broad scale is to get known and get in. We've had to refine that tighter and tighter down to specific functions and real products and support."

Indeed, the company had a conscious strategy -- at least in hindsight -- of first creating a brand with free content, and then selling the content that created that value over the Net at extremely low cost. "When we began, it was great to establish our brand by getting this product out on the Web: 54 million copies out there. We are known. We accomplished that."

"But long-term that was not the sweet spot of the market. Our next tactic was to get into electronic commerce. And finally there's the intranet and extranet. Our next phase is to allow our intranet customers to do a better job of connecting to their extranet customers. The consensus is that intranet software today is a $2-billion market, growing to $10 billion within three years. The Internet software market -- basically Web tools -- will grow less, to a $2 billion market within two to three years." Why the disparity? Because the intranet market requires hand-holding and support and more complex products. "It's the difference between Borland and Oracle," says Barksdale.

Warming up, he continues, "We're born from open software; we live and die by openness. We're cross-platform, cross-database, cross-OS. We have to help install customers' software and train our [sales] partners, but we don't have to help our customers go back and change their legacy systems and platforms and desktops. Still, there's no magic. We have great products; we have great sales and marketing. We have 1000 people in sales and marketing and support. That's a serious company -- almost as much as FedEx when I left. We thought that was pretty big."

As a former CIO at Federal Express, he says, "In my own company, we don't do things 'cause it's open. If my own CIO came in and said he wanted to buy something because it's open, I'd say, 'You're nuts; show me the business case!' But we do have the business case: technology leadership in every survey, and the highest return on investment for customers. We're less expensive to buy, and we're less expensive to install and administer. The Navigator itself is the interface to all our products. So many people are concerned about cost of ownership, and we win on that -- hands down."

Jeff Bezos: Back-office for content-providers

"Business model has a traditional meaning and a new Internet meaning," says Jeff Bezos, founder of Amazon.com. "The traditional one is what are your gross margins on revenues? What are your net margins? But the Internet model is more 'meta': Where do your revenues come from in the first place? Transactions? Subscriptions? Advertising? Or are you just going to save money and increase your margins that way? Our business model is transactions. In the future, we could look at very targeted ads. If you're buying a book on kayaking, for example, we could show you ads for a sports equipment store in your area."

Amazon's business model is actually that of a traditional retailer; it buys books low and sells them higher. But it adds twists that can be done only online. The first is obvious -- serving customers worldwide online, letting them browse and search an immense catalogue. It can save money by avoiding all the costs associated with retailing, including holding inventory and operating retail locations. (To compensate, the company has costs of its own -- developing all its online content, with more than 50 editorial sections, and customer support. The company won't disclose how many people it has devoted to each task, but it currently has 260 employees, up from nothing 20 months ago.)

Amazon's Associates program, started six months ago, takes everything another step. "It can work only on the Web," says Bezos. "The value we're offering here is how to be an editorial authority on 300,000 narrow-niche subject categories; that's how many the Library of Congress defines... everything from kayaks to dogs -- as specific as Labrador retrievers. We find all those passionate self-proclaimed domain authorities."

The company has garnered 7000 associates, ranging from Netscape, CNet and "the Web's oldest and best place to buy meteorites," to the publishers and authors themselves, among them Dr. Ruth. "Authors can effectively double their royalty stream," notes Bezos. In return for the 8 points, Amazon gets incremental business and a crack at new customers. (It keeps customers' names and addresses for its own use. It doesn't give them to third parties, not even to the referring sites; the sites know from their own logs whether someone clicked on Amazon but can't tell whether or how much he bought.)

What Amazon is really doing is helping small operators benefit from Amazon's economies of scale. They create value; he cuts costs.

The Associates are able to offer profitably a small selection of books and sell in low volume. "Where else could you have a bookstore with just six books on model rocketry?" asks Bezos enthusiastically. "We do the order-taking, the logistics, the gift-wrapping, everything else."

The pie splits up this way, out of each dollar of list price:

discount to customer:	10 cents
fee to Associate:	8 cents
gross margin to Amazon:	22 to 30 cents
residual to publisher:	52 to 60 cents

Of course, that is all subject to negotiation, and it will change over time.

Bezos likes the thrill of changing a marketplace. Not a salesman, he's actually a computer scientist who studied at Princeton and then became a quant on Wall Street, ending up at D.E. Shaw, the company that started Juno (see **Release 1.0**, 1-97) and Farsight. He had a quarter of the company reporting to him, he says, when he came up with the idea for Amazon. "I projected out to being 80 years old and put myself in a regret-minimization framework," he says. "Would I ever ask myself, 'Boy, what would my 1994 Wall Street bonus have been?' Not likely! But I could sincerely regret not doing this..."

After some study, he chose Seattle to start up in, both to minimize sales taxes and to be near a major book wholesaler's warehouse -- in this case, Ingram's Oregon warehouse. Like its customers, Amazon orders electronically, but the merchandise shows up on its loading dock to be wrapped and shipped individually.

"Right now we're in the simplicity stage, where everything goes through a central hub. The next step is to complicate things dramatically to achieve lower costs, once we have volume and the executive bandwidth," says Bezos. The company's head of logistics is Fernando Duenas, who built Federal Express's first regional hubs and oversaw the transition from a system centered at a single hub in Memphis.

Clearly, Amazon has to keep running to stay ahead of the game. Its proprietary advantage is its employees' expertise and a few relationships, nothing more. Bezos knows he may have to drop his prices further in response to competition -- but he wants never to compete on the basis of price alone.

As scientist and as participant, he is fascinated by the effect that online sales will have on sources of supply -- on publishers, in his case. "Their two biggest problems are returns and knowing the customer," he says, indicating how well he knows the supplier. "Online book-selling will completely solve their problem," he notes -- a little glibly. First of all, Amazon can give them demographic, but not individual, information to their hearts' content. Second, it can help them market to small groups directly. "How do you market not to 10 people (you just call them) or to 100 million (via television) but to 10,000?"

"We can redecorate the store for all our John Irving readers. Say a publisher has a new, young John Irving read-alike. That's huge! Those are the books where publishers make all the money. They don't make money on Tom Clancy; he and his agent make all the money."

John Reed: Trust, but verify

"I'd be careful about assuming that everything will start here in the US." So says John Reed, chairman of Citibank.

He has transformed it from New York's City bank into a global powerhouse with a reputation for leading-edge technology. He's intrigued by the intersection of the Forum's world with that of personal finance: "I mean electronic banking in its full dimension, globally. The pace will be mediated by early adapters, not all of them in the US."

"For example," he notes, "Asia has a much younger population. Note also that the Net is intrinsically young. Just a small proportion of the population of India is tens of millions of people.

"There are some early adaptations to things in Asia. There is some iris ID technology around that may do away with the need for people to carry cards.

It will have a profound impact on point-of-sale systems, credit cards. My guess is Japan will be an early initiator. And Brazil is ahead of the US in electronic banking. In the US, we have an alternative infrastructure that works. But in these other places, they are more ready to adopt the new approaches precisely because what they have often doesn't work."

Just as he's looking abroad, Reed is also looking behind his back. "Our competition right now is other banks," he says. "But in the long run, it will be everyone from Fidelity and Prudential to Intuit, Microsoft and Oracle."

In that field, notes Reed, "Our core competence is trust. The customer trusts that we exist, that their money is safe with us. Our advantage over a pure electronic offer is that trust. Intuit is great record-keeper, analytical, valuable, but..."

"We do a lot of market research. There's no question that today we are seen as a trusted intermediary. We are very transparent and we follow clear rules [our own and the government's]. That is not a characteristic of most computer companies. Look at the PC industry's advertising: There's nothing in it that would cause people to see them as a trusted supplier. Our history is as a repository of trusted information. Even with the government: We don't give the government information about a customer without a subpoena, and if subpoenaed we advise the customer.

"We're findable; we're accountable. If you lose your credit card, you're liable for $50 and no more. Take Amazon: I buy a lot of books from them, but I don't know what would happen if they said they sent something but I didn't get it." (We're sure Bezos has an answer to that, but the point is the customer's *feeling*.)

"We're required to know who our customers are and to know that they're decent, honest people. The law holds us accountable. If someone comes in with a thousand $20 bills, we can't say we didn't notice."

But you can't live on the value of trust alone. On the cost-cutting side, Reed believes, "We have to be as good at the operations side as anyone in the computer business. Just as the basic asset is trust, the internal production function is talk." That, at least, is open to greater efficiency. "We talk to customers, talk to lawyers, accountants, come up with solutions and talk about them. That is immensely susceptible to modernization using the intranet. We will do our business at 20 percent of current costs."

Steve Rattner: A golden age for competition (and M&A specialists)

Steve Rattner began his career writing about economics for the New York Times, and gradually got lured on to Wall Street. Now he's one of the leading investment bankers helping to consolidate the industry, masterminding such deals as the sale of Continental Cablevision to US West, Paramount to Viacom, McCaw Cellular to AT&T, and Ziff-Davis first to Forstmann Little and then to Softbank.

Predictably, he is relatively sanguine about the dangers of excessive consolidation. He looks at the industry both as an economist and the journalist he once was. He's more circumspect than he might have been, given his high-profile clients, but his world view fits comfortably with his activities. He recently wrote a piece for Media Studies Journal calling the current era "a golden age of competition." Thanks to technological change and deregulation, you have a breakdown of old oligopolies -- like the historic domination by the three television networks -- and a bubbling-up of new efforts. Call it the greenhouse feeding the jungle.

"Whatever," says Rattner, "the consolidation of large companies means far less in terms of reducing competition than it used to. I'm fascinated by this issue -- the amalgamation of America. What is an appropriate level of consolidation in the economy? Certainly, global competition has changed our notion of what you have to do to preserve competition in this country. Twenty years ago, there were huge battles over mergers that wouldn't raise an eyebrow today. Now we're doing them in the name of competition and efficiency.

"It's true that today's stock market is driven by a high level of profits, companies' ability to enforce discipline on wages. Also, corporations have more pricing power than before because of consolidation, for example in the airline business in certain markets [an industry he knows well as a frequent customer who rarely books in advance].

"But in our industry," he says, meaning content/media, "it's happening and it's not happening. There's huge consolidation going on, but because of improvements in technology and deregulation overall, it's getting more competitive. No one from the past would ever believe we'd risk putting AT&T together again, letting it into local service. But there's new competition from anyone with two nickels to rub together to start a phone company."

In the context of this panel, the job of media companies is to create value, largely through proprietary content; the job of distribution companies is to cut costs. Says Rattner, "The other side is the delivery of things. That world has gotten for the most part hugely competitive. Look at the proliferation of wireless companies -- not only cellular but also PCS. Or take cable vs. satellites vs. telcos vs. MMDS. That's why, especially on the distribution and content side, these stocks have performed so badly. They're all in one dogfight or another."

"The telco vs. long-distance fight is all over how these businesses become truly competitive and try to tilt the playing field their way, in the hope for us that overall it becomes level. From a consumer point of view, it's beneficial. We still have a strong top group, but thousands are coming in. Long-distance rates are down dramatically, and at least the good ones are making money. That's what we're trying to accomplish."

Should content and distribution be mingled? "I do think that as we go through this transition, access of content programmers to distribution and vice versa is in the public interest," says Rattner. But should you arrange that in some formal way? Probably not; no combination of interests or market position is that firm anyway. "Certain kinds of content are really proprietary. Maybe that will continue to change -- as it has for the TV networks, which are certainly no longer dominant. CNN is still an extraordinary brand, now you have MSNBC, Fox, Bloomberg. In a world that changes this fast, nothing will stay the same. Just look at the volatility in stocks like AOL and Netscape and you'll see how quickly perceptions -- mostly about competitive position -- can change. And look at Bezos: He created a great idea and a great franchise. Hopefully he'll do fine, but it'll be Darwinian."

COMMUNITY MODELS

Language helps make meaning, but business models put food on the table. The techno-social changes we are going through now are particularly fascinating because they encompass both worlds, and many more. Many issues probably won't be resolved for years, including identity management, governmental jurisdiction (especially to whom do you owe taxes?), structural cost models in many industries, allocation of costs among sectors and the social effects of all this connectivity. Some of these issues could lead to completely unexpected (and catastrophic or beneficial) events.

It's possible, though, to see a little way into the future. This panel, which combines business pragmatists with a science-fiction wizard, is designed for that task. Its job is to puzzle through some of the interactions between traditional business models, new Net-enabled models and some relatively distant vision.

It does try to address serious questions: What is life like in the new infrastructure? How is it changing our behavior and expectations? Corporate cultures? How are businesses organizing themselves differently because of the infrastructure? Does community -- whatever it is -- pay? Whom? What role does it play for individuals and businesses?

John Hagel: Community ideas in suits and ties

John Hagel has been at McKinsey, where he leads the "multimedia practice," since 1984. His first brush with the precursor to an online community came in 1980, when he and a couple of colleagues left Boston Consulting Group to co-found Sequoia Group in Larkspur, California. Just as he later became John Hagel, author of "Net Gain," his co-founders became Scott Oki at Microsoft, Michael Rothschild (PC Forum 1991) of the Bionomics Institute and Jim Hornthal of Preview Travel. The company built computer systems for doctors on Alpha Micro minis. After a year they sold it to MetPath, hoping that would enable them to be part of the medical mainstream. Even then, Hagel says, "We saw it as a sort of front-end for the physicians, an electronic distribution system to connect doctors." Instead, says Hagel, "the only guy at MetPath who knew anything about computers left three months after the acquisition and the whole thing stagnated at $5 million a year."

One by one the founders left. Hagel went to Warner Communications to join Atari, and ultimately to help sell it to the Tramiel family. Then he got seduced back into consulting by McKinsey. "There were so many fundamental changes going on, but I had lost sight of them because I was so focused on one company's problems." McKinsey offered him the chance to see a broad range, but stay focused on computing and telecom.

The driver of the community perspective he lays out in "Net Gain" was "just being online and seeing what happened each time you had such an environment.

Despite all the talk about information access, people were really connecting with one another. We watched Prodigy spend all its effort on broadcasting news reports, only to find out they really wanted to talk to one another. But the architecture wouldn't support it. Then America Online came along."

At McKinsey, he says, "We were seeing things like the Internet newsgroups, and discovering this whole underworld of 60,000 BBSes, where people were just connecting to one another. They were totally under the radar of press coverage of online services and the Internet. Then we read Howard Reingold's book, 'The Virtual Community'."

They took this vision to their work with large media clients, and because they were from McKinsey rather than from some weird Silicon Valley start-up, they got a hearing. "[The clients] were just putting their existing content onto the Net and finding out there wasn't a lot of enthusiasm for that," says Hagel. "That gave us the opportunity to ask them to sit back and explore a new approach. We started integrating communications and content to create communities, and unleashing commerce around those communities."

Earnestly, he concludes, "I want to emphasize that the book is just an opening salvo. There's a richness here we've just started to delve into -- a big research agenda and a lot of work to do with clients."

[Any resemblance to actual McKinsey clients, whether living or dead, is unintentional and purely coincidental.]

Scott Cook: The principles of fair play

As the Web years tick away (one Web year equals roughly two conventional human months), Scott Cook becomes more and more convinced that the Net will cause the most profound change his business and many others will see for many years. "QFN [Quicken Financial Network] is our future. All of our work is Internet-based. It will allow us to deliver fundamental breakthroughs we could never have done on floppies," says Cook, the chairman of Intuit Software. He continues, "There will be fundamentally new products and services of the magnitude of the cash management and money-market accounts that could only be created in a Net-based world."

In principle, the Net allows for lower-cost infrastructure, which should lead to better prices for buyers, but those benefits aren't visible yet. For example, online prices for insurance are the same as what you get over the phone. Cook expects that to change soon, especially as transaction volume grows and companies take advantage of niche opportunities. For example, a company offering runners life insurance might choose to have them submit their race times online, then factor the times into the rating process to be reflected in their rates.

Cook also foresees the Internet acting to continue the decades-long trend toward specialization by and within financial institutions. Says Cook, "Full-service banks have faced strong competition from specialist firms in mortgage lending, cards, investments, etc. They've responded by dividing themselves into independent business units within each business. So many of these units are out of the running and not even considered by prospective customers. The Internet will enable all these specialist units to reach the best prospects through market arenas that bring together buyers and sellers." Cook is designing part of QFN for this sort of activity.

Trust makyth markets

As Citibank's John Reed notes (see page 19), trust is essential for a company offering financial services. Trust has many faces, from knowing you can recover your money in case of bank failure to feeling that you can count on your advisor's counsel. Add Web interactivity to the mix, especially among visitors to a site, and the situation gets complicated quickly.

One small but significant way that QFN is working to establish trust is by making sure there's no question about what's advertising and what's editorial on its site. All ad banners have the word "advertisement" in their upper-lefthand corners. There will be no non-banner ads, such as advertorials. Intuit will also be explicit about the ways it safeguards its customers' data when they answer questions. It will state the specific benefits and protections.

Cook also sees "an opportunity to be the consumer and small-business advocate, to get the story their bank is not going to tell them, and to get the deals any single bank or insurance company can't offer them. Intuit has to help people be able to deal with the issues. Customers need to know someone's trying to give them the straight scoop, as opposed to trying to sell them a product or service."

Intuit is creating a trusted environment that will eventually allow companies to use individuals' Quicken data, given explicit permission to do so. This way, for example, lenders could analyze a customer's books electronically to recommend refinancing or consolidating loans. If Cook can make this happen, he stands a good chance of making Quicken the electronic front porch where financial services come to do business.

Vernor Vinge: When the environment wakes up

Vernor Vinge's science-fiction short story **True Names** is a new-media cult classic. (We cited it in the issue about online identity; see **Release 1.0**, 4-96.) His best-known work, the 1992 novel A **Fire Upon the Deep**, makes entertaining use of an intergalactic communications net to fuel the plot. In the book, a blight is making its way across the known universe, from what Vinge (pronounced VIN-gee) calls the Transcend, where everything, including physics and intelligence, is souped-up, to the slow zone, where physics slows down and speedy travel is impossible.

Vinge's day job is as a professor of mathematics at the San Diego State University. Much of his work is in complex analysis and geometric function theory, but his focus has drifted to computer science, specifically distributed systems. The first story he ever sold was **Bookworm, Run!**, about a computer/chimpanzee interface (Analog, May 1966).

As one might expect, Vinge's thoughts span near-term changes such as the effects today's Web may have on our social interactions as well as distant ones such as what happens to our sense of identity when we can effectively dissolve into a web of distributed processes. About the near term Vinge says, "People think of the Web as a technological advance and a way to invest in new technology. It's also a different way to get people together to do things, analogous to the invention of limited liability corporations, which allowed for new kinds of business arrangements." Imagine new micro venture capital markets and other variants.

Draw on the network

For the more distant future, Vinge envisions a time when humans are outnumbered by automated entities on the Net, some of which are more capable than humans in various ways. The humans and automatons aren't that separate: They can actually transfer processes to each other, effectively calling on a huge distributed platform for thorny calculations or searches, or offloading boring and repetitive tasks.

The nodes would have some knowledge of where they are and enough intelligence that they could configure themselves, greatly simplifying installation. You could simply sow nodes across an area and they would arrange themselves. The next step, Vinge postulates, is that the environment wakes up. Active materials meet distributed processing and everything you run into can sense your presence and respond to you. It's a magical real world -- a cross between extropian utopia and micro electro-mechanical systems (MEMS) run rampant.

Vinge has written widely about the notion of a technological singularity we must go through, beyond which prediction is impossible. The singularity might come about through the mingling of many peoples' consciousness or as intelligence is redefined by the creation of artifacts smarter than humans.

The notions of distributable intelligence that Vinge is working with lead naturally to the issue of self-awareness. Maybe it's possible to upload yourself into the network and die for a while, then come back to life. You would dissolve into the environment.

At a different level altogether, this process already takes place with ideas, and the more our world gets connected, the more ideas can move, share genes, mutate and so on. Of course, because we can manipulate them directly and communicate them efficiently, ideas can change much more quickly than organisms can evolve. Until Dolly, that is (though she doesn't resolve this particular issue).

WEDNESDAY

PRIVACY AND IDENTITY

Who owns your identity?

First, let's define anonymity and privacy. They are not the same thing, but they overlap. Anonymity is the lack of identity; privacy is control over the use of confidential information about an individual. Privacy means keeping information about a particular individual or a communication between individuals or within a group confidential. Privacy is a contract between identified individuals and other holders (not owners) of information about the person or his actions. Ideally, all the information is kept private.

By contrast, anonymity simply keeps an individual's identity from disclosure even when he makes statements or actions in public. Anonymity gives people privacy, but it is not quite the same thing. That individual may be anonymous, with no identity, or pseudonymous, with a fake but persistent identity: If Joe Klein had managed to write a second novel without being discovered, he would have had a persistent pseudonym. Anonymity allows you to attract public attention without accountability for what you say. An anonymous person has no reputation; a pseudonymous person may build one (and hide a previous one).

So where is anonymity appropriate, when is pseudonymity okay, and who must disclose their identities? This opening salvo is worth parsing: The first issue is the distinction between when and where. Can there be places set aside in cyberspace where anonymity is okay? Their very virtual location marks them as a place where people's words are not to be believed. But at the same time, must there be some accountability? How can it be achieved locally without turning ISPs and operators into arms of the law? Can communities form their own little circles kept private from the outside?

Second, who? People can be anonymous as consumers, but what must they disclose as producers, fiduciaries, service operators and the like? How much can a trusted third party mediate, keeping people's identities secret as long as they observe certain rules?

And finally, when? Under what conditions should disclosure be necessary? How much can we simply rely on the "market," letting participants themselves set the standards of disclosure for the people they deal with socially or commercially?

Esther Dyson: Labels & disclosure

Esther Dyson gives an illusion of openness, but she's actually fairly private. Rather than complain about intrusive phone calls, she threw out her home telephone years ago. (She also lost her cell phone, a gift, several months ago somewhere in the swamps of her famously jungle-like office.) Rather than tell secrets about people such as Juan and Alice, she listens a lot. And although she's a big fan of consumer privacy (see **Release 1.0**, 2-97), she sees the issue more as one of control than of privacy. "Long run, I don't think people will have the same attitudes towards privacy that they do now. Imagine thousands of years ago when they first had mirrors. People probably thought they were really creepy; they hated seeing their reflection. Right now, seeing information about yourself is like seeing the back of your head; it's disconcerting. But everyone else already knows what it looks like."

Yet the privacy issue to Dyson is more one of users having control over the trade-offs they want to make for privacy. Dyson's trade-off -- no home phone -- may be extreme, but it suits her. Someone else's trade-off -- you folks with the beepers and the cell phones, you know whom we mean -- suits them. To the extent it's a moral issue, Dyson believes, it's more about one's ability to choose than what the choices should be.

But should privacy be a privilege of the rich? "Oddly enough, it's the rich and the poor who have always lacked privacy. The poor live together, and the rich live among servants. It's only the middle class who have space to themselves. And right now, this notion that each child should have its own bedroom...that is an historical anomaly."

In fact, Dyson favors openness where possible. "Personally, I'd prefer an open society. I think anonymity is akin to abortion. It's a choice people should have, and it's often beneficial, but it's one that should generally be avoided. There are valid reasons for making the choice on occasion, but overall society is best served when people are visible, and children are wanted." On the other hand, she notes, anonymity is different from role-playing in fantasy worlds (although it can be addictive for troubled personalities), or little tricks like interviewing yourself for an article.

She continues, noting her role as chairman of the Electronic Frontier Foundation, "But I want this to happen on its own, without government regulation. That's why we moved the Electronic Frontier Foundation from Washington to California. We don't just want to stop the government from doing things; we also want to *encourage* the industry and individuals to do things -- to take responsibility for their own actions, for their children, for the services and products they design."

As for privacy, she adds, "That's why I like eTrust [EFF and CommerceNet's privacy initiative], and the whole idea of any company promoting how it controls the use of data as a customer benefit. They don't need government permission to do this; they just up and did it. Customers need to start understanding that they have control; they can refuse to deal with merchants who don't meet their preferences -- whether it's product specs, privacy, or even just bad grammar."

Christine Varney: Open mind, open markets

Christine Varney is one of the new breed of regulator. She has a family life, and better yet, she has a husband in the business; he works for Unify. That experience has led her to the conclusion that the high-tech business moves too fast to regulate: "The half-life of any technology is about 30 days. That's shorter than it takes to hold a hearing, let alone make a ruling."

She came to the Federal Trade Commission in 1994 after a stint in the White House as Cabinet Secretary under President Clinton, for whose campaign she was chief counsel. As a Law Fellow at Georgetown, she studied under Robert Pitofsky, now FTC Chairman and known for his interest in antitrust and competitive markets as opposed to regulation. "He's trying to pull me back and bring them along," she says of her role as the Commission's most free-market-minded member.

When she left the White House, she wanted to continue her government service working on policy issues in "a more thoughtful and measured way than the White House allows," she says. "In the White House you often just make decisions; it's harder to do policy development." She has a certain interest in crypto policy, and spoke on it lucidly at EDventure's High-Tech Forum in Europe last October. But the FTC really has no jurisdiction on encryption, even though it certainly comes at it through privacy. In fact, Varney's main love is free markets and one of her main concerns is fraud, including fraudulent promises of privacy protection. "Fraud cuts across every medium," she says. "I'm sure there was fraud when they were writing promises on stone tablets."

She's intensely interested in the concept of market-based regulation. Soon after she came to the FTC she organized hearings on the role of the FTC in the next century. It was pretty clear, she says, that privacy will be a major issue. But her approach to dealing with it is novel: "The government should *foster* a marketplace for privacy; it shouldn't run it. Its main job vis a vis privacy is making citizens and business aware that the government is looking at the issue, so that they come up with something for themselves. It should intervene only where there's a market failure."

Where might those market failures occur? we asked. "It could be with children, medical issues. And with any market, we want to make sure it's open; you can't have a self-regulatory system that in reality is exclusionary and anti-competitive and only lets certain companies play."

As for her plans after the FTC, whenever that might be, Varney claims her own right to privacy.

Johan Helsingius: Man makyth models

Imagine a country so small that ordinary citizens have some chance of influencing government policy: a country with a population of 5 million that has 500,000 Internet users, the highest ratio in the world.

That country, Finland, is the home of Johan Helsingius, formerly a mild-mannered country manager for EUnet, and now a leading figure in designing European governments' approach to the Net. Recently awarded the EFF Pioneer Award, he participated in launching EUnet Finland in 1985 as the local partner of what was then the nonprofit, European portion of the Internet. He oversaw its decision to open up access to the then Soviet Union in 1989, and helped privatize EUnet Finland in 1992. Helsingius started his own remailer, anon.penet.fi, to provide anonymous forwarding of e-mail to anyone who cared to use it. (The service did not support binary files, i.e. the dirty pictures that many outsiders claim constitute a large share of anonymous traffic.)

By last summer, users were sending about 9000 messages through anon.penet.fi a day; many of them wrote grateful e-mails directly to Helsingius -- his only way of knowing much about his customer base. They included the usual dissidents cited by anonymity proponents, Bosnian refugees fleeing for their lives, people subject to abuse and harassment for one reason or another, and certainly some abusers and harassers who didn't care to write to Helsingius directly. They also included a C programmer with some basic questions afraid that his boss might discover his ignorance, another errant employee who took time off to care for a sick child but gave another reason to his boss, and people with other humble problems.

And finally there was the user who was posting information the Church of Scientology claimed was covered by its copyrights. The Church prevailed upon the Finnish police to force Helsingius to give up the identity of that poster. Because Helsingius' service was not truly anonymous (he kept a database matching senders to messages), he was finally faced with the choice of giving up that one address, or having the police take away the entire database and compromising the anonymity of everyone in it. A year later, a similar situation arose and ended up in court. The court's decision "clarified" Finnish privacy law and revealed that it does not cover electronic mail. As a result, he gave up the name and closed down the service.

Those are the bare facts. The textured fact is, he ran the service on a voluntary basis for over three years and found it an increasingly arduous task. "Anonymity" is not a digital, technical thing, but a cultural service. In response to complaints, he did shut off certain senders, applying his own best judgment on an arbitrary basis. That worked fine until the crisis with the Scientologists forced a private, voluntary service into collision with legal authorities.

After closing anon.penet.fi down, Helsingius first took some mental time off (although continuing with his day job). Now, instead of reopening the remailer, he is actively trying to clarify the legal status of such services in general; there are about 30 of them operating around the world today, and their legal status is unclear. Helsingius is working not just with the Finnish government but encouraging the Finnish government to set a model for government action in other countries, for anonymity and in such areas as electronic payments and censorship.

"I'm getting pretty involved on a pan-European basis on some of the political issues," he says. "We're using the Finnish government and its initiatives to look for some of the legal problems, and then we want to use Finland as a pilot country for all of Europe. We're mainly looking at existing legislation and to see how it needs to be adapted. Instead of saying 'no, no, no,' we're trying to short-cut things by providing a positive example. We're trying to figure out how to guarantee security and privacy, and also accountability. I definitely feel very hopeful."

So far, the product has been mostly some government reports that look into the issues and give some recommendations, he says. There are now also some concrete proposals identifying the grey areas in specific parts of the Finnish legislation and proposing ways of resolving them. You can take a look at http://www.telmo.fi/telmo/telmoeng.htm.

"Regionally, the feeling has been that the situation with penet and the Church of Scientology was an accident that happened because people couldn't foresee the implications of existing legislation as it applied to new media," says Helsingius. "Most countries are very interested in dealing with the harmful side but coming up with reasonable solutions. They've been a bit scared by some of the more extreme initiatives taken in response to the perceived threat of things such as child porn. Anonymity is a very important thing that has to be preserved and protected." If the likely clarifying legislation were passed, he would feel comfortable restarting anon.penet.fi. But right now he's working on making the world safe for it.

The example of Finland raises many interesting questions. What is the difference between a "democratic government" and self-regulation? Many current governments started as self-regulatory efforts set up by revolutionaries, but their rules were imposed on everyone in the territory and their administrative systems have since grown stale and crusted. One hope the Net offers is the possibility of self-regulation on a voluntary basis, within communities that are optional. How can we foster such communities and keep them alive and dynamic?

TENDING THE INFRASTRUCTURE

The US communications infrastructure is nowhere near the state people wish it were in; other countries fare differently, and generally worse. Some countries with horrible phone infrastructures may be the luckiest, because they have an opportunity to jump to better technology. Overall, the landscape is ugly, and the massive deregulation just started in the US will probably make things worse before they get better.

Life as a local phone company seems worse than being a long-distance carrier. The phone system is designed for a small percentage of potential callers to pick up a phone and tie up the network's hardware at any given time. Online access keeps people on far longer -- especially in places with unmetered local service. Attempts to offer more efficient access with XDSL technologies (X varieties of Digital Subscriber Line) are rocky; one DSL is not like the next, nor does one vendor's gear work with the next's. None of these are concerns of the interexchange carriers, until they decide to compete locally and bring those problems upon themselves. Wireless service and direct broadcast satellite are bright spots, but who will own them?

Cable system operators have a pipe, not a platform. Most of them are struggling to choose technologies that will give them two-way communications, but they keep being distracted by short-term revenue sources such as pay-per-view and short-term problems such as debt repayments. The few cable initiatives that take advantage of the system's great connections to customers' homes and add Internet connectivity, notably @Home (see page 33), should do well, and might stimulate competitors to join in.

US Internet service providers are struggling to meet demand and make a profit under the $20-a-month unlimited-access price umbrella that exists today. They have few value-added services to offer, and quality of service (QoS) guarantees aren't possible yet on the pothole-ridden expanses of the Internet, which will keep ISPs out of potentially lucrative businesses like Internet telephony and videoconferencing. A few networks are investing heavily to offer QoS on their pipes and charge premium prices for better access and new services.

All of these players are competitors *and* allies, often at the same time in different parts of their business. The situation is not particularly stable yet; not enough of the future has unfolded for things to find a new, if still temporary, equilibrium. We don't really know what future traffic patterns will look like, or even what the switched/routed/broadcast packets will look like. Open questions abound: Is there too much network capacity or too little? Where are the key bottlenecks? Are companies investing in the right infrastructure today? Will Internet peering arrangements continue, or will all carriers have to count their bits and bill each other? What is the best role for wireless? For content?

There will probably be more rounds of industry consolidation. New access fees and taxes are unlikely; they would greatly favor the local-exchange phone companies. Network computers might make a surprise surge, shifting market economics and industry power balances. Many things could happen, but the frustrating fact is that few people have a good idea of who will make money in the future infrastructure.

ANS Communications and @Home are in the center of this maelstrom. They must navigate between aggressive investments in the platform of the future and simply ensuring they can continue in business as they are today should a surprise event occur in the market.

Bruce Bond: Net effects

ANS Communications is one of the original Internet services. It was formed in 1990 as Advanced Networks and Services by IBM, MCI and Merit, a consortium of Michigan universities, to design and run the original Internet backbone for the National Science Foundation. ANS was an early provider of private corporate Internets. Along with SprintNet, ANS also supplied dialup access to America Online. AOL liked the company so much that it bought ANS in February 1995.

Today, ANS is a solid managed-network services provider that will end 1997 as a $160-million company. If current growth rates hold, in four years it will pass $1 billion in revenues. The company offers high-quality access, hosting services and private wide-area networks, all of which are promising businesses. ANS offers service-level guarantees on end-to-end access. Its ANSnet offers performance that geeks love, such as sub-70 ms latency cross country and under 0.1 percent packet loss.

ANS is in a high-pressure business. Its corporate customers expect flawless service, and all across cyberspace, carriers and service providers are racing to add dialup access capacity to catch up with retail customer demand. America Online has clearly suffered the most from access troubles, earning the moniker America Off-Line. ANS provides 40 percent of AOL's dialup access, through over 100,000 modems. Last October ANS installed 2500 modems; this February it installed 16,000. The company is the first ISP to field trial US Robotics' new X2 56 Kbps modems.

ID number 8

ANS's president is Bruce Bond. He has only been there since last July, but he's no stranger to networked computers. In 1975, at AT&T, Brian Ritchie handed him Unix ID number 7 or 8. Bond has made his career in telecom, starting in 1969 as a salesman with Ohio Bell. He spent 15 years at AT&T, five at US West and seven at British Telecom in London as the managing director of business communications services, overseeing a staff of 30,000 and $10 billion in annual revenues. He has worked with multimedia, video on demand, interactive services, satellite and managed network services, as well as more conventional telephone service.

Three or four years ago, Bond began to think the Internet would be a serious business. Two years ago, he convinced himself that Internet-based technologies would radically change telecom. "It's going to be very difficult for legacy telecom companies to get here," he says. "They have different assumptions for how you design and develop a communications company. It's exciting to be with a small, leading-edge company."

Culture shift

Much of Bond's interest lies in how the Net and its dynamics affect business structures, corporate cultures and personal perceptions. A graduate of MIT's Sloan School of Business, he worked with professor Michael Scott Morton on the Organizations of the 21st Century project. Bond lectures regularly on this topic at the London School of Business and MIT.

Bond's job lets him examine alternative models closely. "Because of the Internet, more companies are thinking seriously about radical ways to change their supply chains and infrastructures," he says. "You can think of traditional business models as information chains built on old assumptions of the information carrying capacity of the infrastructure. It's interesting how many customers we're talking to who are looking at making these kinds of changes."

The Net is pervasive. Bond observes wryly that many IT professionals didn't have direct contact before with the technologies they managed. Now they are getting a taste of it when the ceo dials in for e-mail.

But the point the Net makes is harder to grasp. It's about self-organizing behaviors, not hard-wired, physical models. Says Bond, "As companies begin trying to implement [the self-organizing models] and they look at how they can change their supply chains and so on, it lets companies shrink-wrap themselves around their customers, as opposed to making their customers adapt to them."

Bond sees two major dynamics in IT managers' minds. People are accepting the enormous power these tools bring. They're also realizing that the tools aren't very easy to implement. "You have to be very skilled," says Bond. "This is the Age of Magic. The companies with the best magicians will do the best, and they aren't the telcos."

His take on AOL's access crisis emphasizes the mental shift it caused. "[The crisis] caused AOL to rethink who it is. Until then, it's employees felt their job was to be cool. Then they started to get bad press coverage, which was traumatic. Now they are a national institution that people depend on as infrastructure to run their lives. It changes how they treat their customers, suppliers and so on."

Carrier signals

On the carrier side, Bond notes that telecom networks are all about control. "To the telecom world, the network is almost a religious concept. The idea that there might not be The Network but rather a self-organizing, customer-defined environment is completely foreign to them. In contrast, the Net has an organic, evolutionary model where thousands of ideas, many bad, emerge and make their way to extinction, to a small niche or -- for the brilliant ones -- to the center. On the Net, users can put applications together when they need them, whether it be the latest Java code or RealAudio plug-in.

But technology isn't the big deal. In the end, Bond says, "This IP [Internet Protocol] world is about people-to-people. It's not about on/off, it's not about zeroes and ones, it's all about conferencing, presenting... things that make people more effective."

Tom Jermoluk: Connecting with homes

If any cable venture has a shot at succeeding in the Internet market, it's @Home Network, the TCI-Cox-Comcast-Kleiner Perkins startup that operates as a Tier-1 ISP with its own private network.

Tom Jermoluk, @Home's ceo, loves his company's market position. "The key players are those who own access to your home," he says. "Everyone else is a middleman. If you don't own wire, you have to rent it from somebody." And the cable companies have the fattest pipe to the home. Over time, local wireless systems and digital subscriber line technologies may dent the market, but by that time Jermoluk plans to have built many reasons for subscribers to stay with his service.

@Home can also ride the same cost curves that the computer industry is on, which Jermoluk enjoyed as president and coo of Silicon Graphics before joining @Home. The gear ISPs are buying now is getting cheaper all the time. Anyone who wants to build new wired access to homes will have to face the ever-escalating labor and resource costs of digging trenches and installing cables, which narrows the competition to the local phone companies, working with copper twisted-pair, and wireless bypass.

Jermoluk sees @Home's early appeal as full-time, high-speed access, but he believes the real hook is making the system a natural and necessary part of customers' lives. This requires changing the way that people perceive the service from Internet surfing to speedy information access and powerful communications. In September, @Home will have a major release of its core code, which will include integrated messaging, multicast, personalization and more.

@Home has two @-enabled divisions. @Work offers telecommuting, remote and SOHO access, as well as Net access for larger businesses. For telecommuters, the service is like being on the corporate LAN. @Work is creating special small-business offerings that include Web hosting, access, telecommuting and other services.

The other division, @Media, contracts for content and applications to run on @Home and @Work. Its projects include Internet telephony, network games, electronic commerce, bundled subscriptions, chat rooms and some special projects that take advantage of high-bandwidth delivery, such as videoconferencing.

John Walter: Finding partners in a new landscape

John Walter could not have picked a more challenging or opportune time to join AT&T. Chairman Bob Allen just completed a trivestiture that leaves AT&T lighter and more focused than ever. NCR is free to seek its old and profitable path, and what was once Western Electric is reborn as Lucent, where it can compete at arm's length with everyone. AT&T is left with its core services business to duke it out with a wide range of competitors approaching at high speed -- from cable system operators to local telephone companies and Internet service providers. And every one of them is after primacy in telecommunications.

The landmark Communications Act of 1996 turned the regulatory and competitive environments upside-down. At the same time, the technological infrastructure was transformed by the explosion of interest in and traffic on the Internet -- with the help of a few highly visible public offerings. AT&T took advantage of the opportunity. Its WorldNet service has quietly become one of the largest Internet access providers, sneaking into a noisy market alongside MSN, which has also garnered a significant subscriber base.

Amid all this change, many important senior executives left AT&T. The rest of the staff, a bit shocked from rounds of layoffs and reassignments, now awaits leadership. John Walter stepped into this scene last November as AT&T's president and coo after 27 years in the publishing world, all at R.R. Donnelley.

Early this month, Walter made his debut at a financial analysts' briefing, where he startled many analysts with a blunt, detailed presentation and a pessimistic short-term outlook for AT&T. He painted a picture of eroding market share in core businesses, poorly framed customer relationships and increased competition likely to drive prices down.

Outside insights

Despite the short-term gloom, AT&T is in one of the choicest positions in the telecom industry. It has license and resources to compete in many new markets, the opportunity to improve its customer revenue models,[1] a broad variety of services and a brand name second to none.

The question now is whether Walter can get AT&T to cannibalize its businesses before others eat them (it is, after all, a jungle out there), which will require cultural changes inside the company at least as dramatic as those brought by divestiture almost two decades ago. At the same time, he must get units to work more closely than ever before, to deliver on the promise of integrated services and marketing that has hung, undelivered, for many years.

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[1] *Long run, AT&T needs to be in more businesses that guarantee a monthly fee from each subscriber, which isn't true of long distance. If Aunt Hazel doesn't make any calls in July, AT&T doesn't make any money from her. In fact, it may have to send her a bill anyway, which is expensive.*

Inside-out

Walter sees that the communication platform has changed completely, and he wants AT&T to take advantage of it. In the telephony world, the "platform" is a highly structured, monolithic piece of code called a generic that runs on central-office switches and PBXes. It can only be changed by a dozen companies around the world that have the expertise, and then only at the pace that automakers use to deliver new car designs. Worse still, any new features have to be put into operation everywhere at once, guaranteeing slow progress and little significant innovation.

The Internet is an organic, decentralized platform that allows for innovation and rewards good ideas with broad use -- and occasionally overuse. The Net's barriers to entry are amazingly low, whether to offer access, provide services or extend the platform. Practically any computer can run applications across the Net. So many assumptions that hold in the telephony world break on the Net that Walter's background outside telecom should serve him well.

In this world, AT&T can't focus on "fat minutes," the term its management previously used to describe the way it would increase revenues. Measuring minutes is irrelevant when everyone is connected all the time. Instead, AT&T needs to sell high-value services that chew up its platform, and it has many divisions and investments to draw on for such services, including cellular telephones, wireless data, credit cards, outsourcing and direct broadcast TV.

Walter also knows that AT&T can't create or deliver all these services by itself. It must partner with others to deliver them, and on the Net, not on proprietary platforms or even the open but unchangeable phone platform. His new allies will be companies that build Net-aware application software and high-value services of many kinds, from messaging systems to application-hosting services and robust environments for electronic commerce. His new allies are attending this Forum.

Tim Berners-Lee: Shepherding a lively flock

The inventor of the Web is now a cyber-diplomat of sorts. He's in the delicate and important position of fostering the Web's improvement without having direct control over any part of it. Other organizations write all the new code in a competitive climate that hardly resembles the Web's early months.

The World Wide Web Consortium (W3C) was created in the fall of 1994 as a focal point for activity relating to the evolution of the Web. In true Internet spirit, the W3C has little power. Nevertheless, it has remained in the center of action, partly because Microsoft and Netscape, the two major opponents in the browser wars, tend to offset each other well.

In September 1994, Tim Berners-Lee moved with his family from near Geneva, Switzerland, to Cambridge, MA, where the W3C made a home in MIT's Laboratory for Computer Science.

One of Berners-Lee's major challenges is to help prevent any one company from highjacking HTML. Another is to make rational recommendations about the standards' scope, structure, contents and extensions. This is technology we will likely have to live with for a while, a thought that may not have crossed Berners-Lee's mind as he pasted the Web together from borrowed scraps of ideas and clever leaps of imagination.

What's the right mix?

Fascinating technical questions abound. What should be core HTML functionality and what should remain external, to be called as needed? How do you make everyone happy, or at least minimize the number of enemies you inspire? Advertisers want peppy multimedia and objects you can't scrub off your desktop, scientists want mathematical equations and fine-grained screen control, corporate developers want a robust, secure environment that doesn't break all the time and Java fans want to bypass HTML altogether and get on with taking over the OS.

There are many points of contention, including layers versus style sheets, multiple kinds of dynamic HTML and objects and applets that want to take over the screen. The battles and issues range all over the technical landscape. What's more, HTML is the chic protocol today, but there are many other protocols and specifications that matter to the future of the Net. Recently HTTP 1.1 became a focus of attention as companies developed ways to improve Web performance.

Other items of interest to the W3C are distributed objects on the Web, the Platform for Internet Content Selection (PICS; see **Release 1.0**, 12-96), and privacy and demographics issues. Berners-Lee would like to see the Web become more evolvable, following principles of minimal design and leaving hooks and spaces for future functionality. He sees the Web as a force for cultural diversity.

Thank you!!

This Forum would not be the same without the help of several companies and their products (and services), notably **IBM**'s Aptiva PCs, **ANS**'s T-1 connections to the Internet, **Tektronix**'s color printers, **VDOnet**'s digital video clips, **Pixelworks**' huge flat-panel displays, **HP**'s 100baseT gear, **Netscape**'s browsers and servers, and last but far from least, our extraordinary system integrators at **Lante**.

THE FORUM PODS

The PC Forum network features seven themed "Pods," each illustrating a conceptual framework or metaphor in use today to describe and navigate the Net. The seven Pod themes are:

- Physical space
- Conceptual space
- Social life
- Multi-player games
- 3D
- Traditional media
- Brands & advertising

The Pods are accessible throughout the conference from the Forum Website, but on Monday and Tuesday afternoon we will dedicate clusters of networked PCs to the seven Pod themes and have (human) guides on hand to explain the themes and their implications.

Each Pod has a premise -- a world view it espouses as the best way to think of and get around cyberspace -- which it illustrates by pointing to Websites and other Net resources. Please try the themes on and see how you like them.

Here are brief descriptions of the seven Pods. Longer descriptions can be found on the Forum Website.

Physical space

Cues from real life help people get oriented and make use of novel objects. A floor plan can show easily that the Internet 101 speech is in the purple (virtual) lecture hall and the privacy panel is in the red one. When shopping in a virtual store, your "shopping cart" is likely to hold items you want to buy; you'll head for the "cash register" to make your purchases. On a software desktop, the Rolodex probably contains addresses, and clicking on the phone will probably start a phone call. Similarly, file folders contain files and the trash can disposes of them.

All of these examples illustrate how tapping into our experience with real-life objects (or representations of them, such as maps) makes the computing and online experience more intuitive. In practice, however, these ideas don't always work.

Conceptual space

The most efficient way to find and use things is to index them and map them in ways that illustrate their relationships. Why walk down a virtual street or scan virtual bookshelves when you can go straight to the answer you seek with a search engine or taxonomy of terms such as Yahoo!? Why stare at a spreadsheet when you can walk through the data to look for patterns hidden in it?

People naturally think in terms of hierarchies, flow charts, time lines, topologies and webs. Until recently, analytic and presentation tools weren't commonly available. The Web and the Internet have broadened the audience and provided a common viewing environment; new tools have emerged that perform sophisticated back-end processing.

Social life

The Net is about relationships; what matters most are tools that help people build relationships. The Net offers a rich (and bewildering) variety of communication tools, including buddy lists, which let you know when other people you care about are online; text conversation tools, such as chat and threaded discussions; multimedia conversation tools, which integrate voice with chat, document sharing and more; personal Web publishing tools; multi-user virtual spaces, complete with avatars, gestures and exotic environments; and directory services that help people find each other.

Today, these tools are separate from each other and relatively clumsy to use. This situation is improving quickly, but integration will take time. Eventually, these tools will replace the dial tone and busy signal -- today's default communication interface.

Multi-player games

If Pong heralded the direct-manipulation interface, multi-player games might have something to tell us about future groupware systems. Online, gaming "tribes" and "guilds" post news items and boast about their abilities on their Websites. They periodically run tryouts to test applicants for membership. Social games such as bridge, poker, go and chess have a long history online. Over time, it may become as natural to come home and play a game of international bridge to relax as it is today to turn on the tube.

Watch the network-game offerings for innovations in user interface designs, character and avatar design tools, ways to specify and match player skill levels, invitation protocols, communication technologies (inside and outside the games) and community-maintenance systems.

3D

Will we end up flying, walking and zooming through a three-dimensional cyberspace? 3D is flexible; its applications fit many of the other Pod themes. It is useful for data visualization, navigation through realistically rendered city scenes, interactive multi-user spaces, abstract data environments and more. Much of the Web activity in 3D is based around the Virtual Reality Modeling Language; a small industry of tool specialists, 3D designers and online environments has emerged around VRML. There are other popular formats, particularly photographic, 360-degree scenes, which can be combined with synthetic images in useful ways.

Navigating a 3D environment is different from today's computer and Web interfaces. It involves walking and flying, panning and zooming, and attributes such as lighting and level of detail, which users shouldn't have to worry about but affect the experience.

Traditional media

The new medium is like the old ones, but always with a twist. Here come real interactive TV shows with companion program listings on the Web, live viewer polls and on-demand feeds; active classified ads with listings that show the goods (or people) in question, links that help close deals and items that expire when the deals are struck; tailored and media-enriched news with links to raw footage and community commentary. Virtual postcards, e-mail and Internet telephony are relatives of traditional communication media, too.

The premise is that new Net systems are similar to existing technologies and industries, so extending and adapting current models will encompass most Net activity.

Brands & advertising

What matters in cyberspace is having a name people know and a place people return to -- so you can sell the audiences to advertisers. What Website or Net service do you think of when you want the latest news? A recommendation for a good book? A smart discussion about the economy? Some companies have successfully established new brand identities online. Existing companies are moving to bring their names to the Net, sometimes through brand extension (CNN), sometimes by creating new brands (Pathfinder).

Although ad revenues on the Net aren't as big as some companies would like, the advertising industry has moved quickly to establish itself online. Clickthroughs, rate cards and surveys now meter the treasure trove of user activities that the Net makes visible. Online ad aggregators, ad development specialty houses and ad analysis packages are up and running.

Note that these themes aren't meant to be comprehensive or mutually exclusive. They overlap in useful and interesting ways. Long run, several will probably coexist. Some people will stick with an extended desktop metaphor; others will rely on text-oriented search engines and directories, or perhaps on publications and broadcast channels customized to their preferences. Let us know what you think!

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COMPANY PRESENTERS

This year's invited companies have a few things in common. They present clear, practical solutions to broad market opportunities, such as getting small companies on the Net efficiently, improving the expressive power of Net-based tools, managing the profusion of directory services and adding intelligence to the process of retrieving remote information.

They also use the Net and its protocols cleverly. It's easy to envision many of their products nested inside each other, or running next to each other in a corporate application.

For example, work groups could share collections of useful information with Intraspect Software's system (see page 46). To work on a specific document, they could invoke WebFlow's WebProject (page 55), discuss them in real time with iChat's system (page 45) and send out periodic information about their work with Diffusion's IntraExpress (page 42). Or they might create a collaborative environment with Throw's software (page 51) or present their results in PlaceWare's Auditorium (page 50). The permutations aren't merely entertaining, they're also a great way to imagine how features might be combined and consolidated over time.

Companies that are making their first appearance at this Forum are noted with "Debut."

ACCRUE: KNOW THY VISITORS

To assess who visits their sites and what they do during the visits, Webmasters usually analyze their Web server log files, which record all the file requests and deliveries, as well as some information about the kind of browser requesting the files. For complex Websites that replicate server functions across multiple machines and include database access and other operations, looking only at the log files becomes difficult and limiting. Worse, the log files tell only half the story: They contain information on requests for Web pages but not deliveries. Combining and matching parallel log files is difficult; piecing together any specific visitor's trail is especially tough.

Jonathan Nelson, co-founder of San Francisco-based Website developer Organic Online, ran into this problem as his clients, including Saturn, Colgate-Palmolive, Levi's and Lucasfilm, started to demand better analysis of user behavior at their sites.

In late 1995, he got together with Brian Behlendorf,[2] Cliff Skolnick and Bob Page, then chief scientist at Sun's network management group. They figured they would be able to track more events, more accurately and more completely if they monitored network traffic rather than just Web log files.

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[2] *In the Internet Dark Ages about two years ago, Brian Behlendorf, co-founder of Organic Online, was co-host of the VRML mailing list with Mark Pesce; see* Release 1.0*, 7-94. Behlendorf is now on Accrue's advisory board.*

After successful proof-of-concept trials, they brought in Tom DuBois, then director of business development with Nielsen Media Research, and Simon Roy, a McKinsey consultant who had just completed a turnaround for a South African corporation. In February 1996, they launched Accrue (as Gauge Technology; the company has since changed its name) with Page as chief technology officer and vp of engineering, DuBois as vp of business development and Roy as president and ceo. They raised $5 million in early funding from CKS, Organic Online, Sterling Payot, Eos Partners and Mohr, Davidow.

A high-end traffic analyzer

The company's first product, Accrue Insight, is positioned as a high-end analytic tool for tracking Website performance and user behavior. It is targeted to Website owners with high-value applications. The tool is useful to brand managers as well as Webmasters, though the brand managers will have to know some Web jargon.

Accrue Insight became commercially available at the end of 1996. Its customers include CKS Group, General Motors/Cyberworks, Organic Online, Perot Systems, PBS Online and TheTrip.com. The system runs on Sun's Solaris, with SGI and NT versions under development. Pricing starts at $15,000; Accrue expects its average customer to spend $50K to $70K.

The product's front-end uses Web and Java technology; the back-end stores its data in a (bundled) Red Brick data warehouse, which promises better scalability and OLAP[3] functionality than competing products from companies such as Interse, NetCount, NetGenesis and Andromedia, especially in data mining and integration. Accrue has designed 50 reports that are viewable from any Java-enabled Web browser (access rights permitting, of course). Clients can also customize the reports on the fly.

By monitoring overall Website traffic and making careful inferences, Insight can track time spent on pages, the number of links a visitor activates, key words most often searched and performance issues such as the speed, reliability and accuracy of server delivery and network transmission. Insight stamps events to the microsecond, as opposed to the one-second increments typical of log files. The product's Java applets also offer live viewing of Web activity.

Accrue's tools can help Website owners tune their sites as well as get better insights into where visitors go and what they do. For example, an analysis can show where visitors frequently abort their visits, perhaps because images load too slowly or pages are poorly done. Tracking users closely raises privacy concerns, which Accrue's customers will likely need guidance on. The Insight system should help companies make their Websites more useful and sensible to their visitors, rather than investing resources in functions that aren't working or pages people never visit.

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[3] *OnLine Analytic Processing, one of the most awkward market-segment names we've heard in years. It's multi-dimensional statistics and cross-tabs on steroids.*

DIFFUSION: FLEXIBLE BUSINESS INFORMATION DELIVERY

Both senders and receivers of periodic electronic publications have enormous trouble managing their communications. The most popular solution today is the mailing list, which usually transmits only plain-text messages (so far; but wait for the confusion in migrating to the far superior HTML mail!) or virus-prone attachments. Besides, when you receive e-mailed newsletters, they disappear in your inbox alongside the sale announcements from American Airlines, OnSale and CD-Now.

Subscribing to mailing lists is difficult, as is suspending them when you go on vacation -- or even remembering what you subscribed to in the first place and how to unsubscribe. On the sender's side, maintaining lists and preferences is difficult, not to mention dealing with bounced mail and other transient errors. Despite all this baggage, it's clear that these mail-list broadcast publications are extremely important to keeping communication channels open.

There are many other alternatives: paper newsletters that take too long to reach recipients and seldom get read; faxes, which are losing their cachet and becoming a nuisance; express mail, which is expensive and hard to manage for large audiences; private online channels, which require special software; and voicemail, which has extremely limited functionality and works only within companies (more precisely, within range of voicemail systems that can interchange messages).

None of these offers enough flexibility to recipients, particularly as they travel. "Push" technology vendors have focused so much on moving advertisements, caching Web pages and downloading video clips and demo software that they haven't solved the serious business issues we've just described.

Then there's the pull side, where information is available but people have to remember to look for it, then how to find and read it. Today's solutions include file servers, fax on demand, databases, groupware archives, Lotus Notes and Web pages.

Smoothing the path

Mountain View, CA-based Diffusion has developed IntraExpress, a system that allows corporations to set up broadcast channels that flesh out the continuum between "push" and "pull" technologies and help consolidate the information so that it stands out from the standard flow and is available when it's needed. IntraExpress can also help consolidate and manage the messages, faxes and reports that people receive everyday. (Disclosure: Esther Dyson is an investor in Diffusion.)

Download IntraExpress and you are set to receive invitations to subscribe to various electronic publications[4] (the client code combines Windows "wizards" with Java applets). Publishers choose which formats they want to offer:

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[4] *We use the term to includes information that one might not normally consider an electronic publication, such as price lists, inventory status reports, competitive analyses and so forth.*

plain-text e-mail, Web pages, Microsoft Word documents and Adobe PDF files. Others are under development.

Potential subscribers get invitations to Diffusion broadcasts in their e-mail bins. These invitations allow subscribers to choose what file format they want to subscribe to and whether they want to receive the whole publication or just a pointer to the publication. The system manages who gets which invitations or publications in which formats, and so forth. Subscribers can update their preferences at any time, including spontaneously when they are on the road and want something sent to a hotel fax.

Diffusion has been shipping IntraExpress since February. Beta sites include Ascend Communications, Action Technologies and CyberCash. The early target market is corporations' internal communications; external ones will follow. We hope many of IntraExpress' features become ubiquitous elements of the push/pull landscape. Life would be easier.

Cast and credits

Jim Gagnard, Diffusion's president, was formerly ceo of Avalon Software and Trinzic Corp. Rich Schwartz, Diffusion's cto, developed the Paradox database along with Chuck Grasso, Diffusion's vp of engineering. Schwartz was formerly Borland's chief technology officer and was an Internet pioneer before that at SRI and UCLA.

Diffusion, which now has 35 employees, received over $11 million from Institutional Venture Partners, Matrix Partners, Brentwood Venture Capital, Stanford University and individual investors.

GLOBALCENTER: SERIOUS INTERNET OUTSOURCERS

Thousands of small and medium-sized companies don't have IT departments and Internet-savvy programmers to get them on the Net. They also don't have the time to work through all the service and equipment permutations to get connected.

A few companies have created offerings to get these businesses on the Net easily. Two of the most notable ones are GlobalCenter, covered here, and Whistle Communications. Whistle sells a turnkey, headless server that companies can plug in to set up e-mail and their Web presence. GlobalCenter sells a far broader service that should lead to long-term, profitable, multifaceted customer relationships with its customers.

Simply put, GlobalCenter wants to become chief Internet officer for its customers, then take care of the details -- complete Internet outsourcing for serious businesses. President and ceo Doug Hickey explains, "Picture yourself as a small business owner. It's a mess. They're wildly confused by the profusion of ISPs, new Web tools and so on. We take away the risk of obsolescence and play the role of CIO for them. We tell our customers, 'You manage your business; we'll manage your Internet.'"

GlobalCenter is not only interested in keeping its customers insulated from HTML and domain name servers; it also wants to do their Web hosting and help them get into electronic commerce. "These companies really want to sell product over the Net," says Hickey. They also want strong support, which GlobalCenter emphasizes.

The piece parts

GlobalCenter puts a box at its customers' premises, but most of GlobalCenter's intelligence is in the network and front-end management tools. Particularly impressive is the Web environment GlobalCenter has designed to lead customers easily through setup and management of their own e-mail and Web systems. GlobalCenter leases everything; customers don't lay out capital for equipment. When it's time to upgrade, GlobalCenter can migrate them to new technologies and use the gear elsewhere.

Last December, GlobalCenter merged with Primenet, a Phoenix-based ISP, in order to acquire ATM backbone and significant presence across the US. GlobalCenter has agreements with other ISPs such as UUnet that offer complementary coverage; only 30 percent of GlobalCenter's customers don't use its access.

GlobalCenter's target market is from SOHO up to businesses with 500 employees. The company ended 1996 with revenues of $13 million and expects to hit $25 million this year. It already supports approximately 70,000 users at 10,000 companies, which have created 6,000 Websites.

Hickey wants to build long-term customer relationships, rather than a large customer base at any cost. This should give his company low churn and plenty of opportunity to sell added services. Hickey's customers never stop asking for ease of use, so his staff is researching offerings that self-install and have strong growth opportunities. GlobalCenter may co-brand services such as business class dialup to electronic commerce Web services.

In the past three months, GlobalCenter has started to shift from direct mail and telemarketing to a network of resellers that understand small businesses and vertical markets, which it is cultivating now. Desirable partner categories include retail, OEMs (e.g., a cellular carrier can combine Internet with cellular access) and affinity groups. The partners can add content to the offerings; their revenue stream increases the longer the customers stay with GlobalCenter.

Make it smooth

GlobalCenter's engineers spend a lot of time building glue -- making the product reliable, intuitive and self-installable -- and improving support. "You know they're going to call, so make sure your people know the stuff so they can turn the questions around very quickly," says Hickey. GlobalCenter tracks metrics closely and compensates its 32 support people on them. Some service is proactive: If GlobalCenter can read that a customer is having problems, its system can steer them toward a solution automatically.

Migration is also a key issue, since many of GlobalCenter's customers are growing quickly. The company offers easy ways to upgrade access and other features, while minimizing disruptions.

As one would expect, customization is expensive for GlobalCenter. GlobalCenter supports Microsoft Mail and standard Internet mail, but not cc:Mail and others because they represent too small a proportion of its market. Instead, GlobalCenter leverages its R&D to build front-ends that shield small business users from the complexity of the Net. The company's offering supports both PCs and Macintoshes.

Skunks that smell purty

GlobalCenter began as a skunkworks project at Global Village led by Rex Cardinale, now GlobalCenter's vp of engineering and operations. The project was clearly interesting, but its focus on recurring monthly revenues conflicted with Global Village's core business of hardware and software sales. So GlobalCenter spun out early last summer 1996, with funding from Global Village, Sequoia Capital, Hummer Winblad and UUnet; outside investments now total $7 million.

ICHAT: BEYOND THE CHAT ROOM

Two years ago, Andrew Busey was finishing a book on MUDding; now he runs iChat, an innovative developer of chat software with greater ambitions. We first covered iChat in January (see **Release 1.0**, 1-97). At the time, we mentioned that the platform the company has developed was capable of far more than hosting chat spaces. One of its upcoming features is a buddy list, though Busey doesn't find the name professional enough. His choice, "paging," carries too much baggage for us. Suggestions?

Companies with good conversation technology will probably end up following one of two paths. They will either build specific-function products that find niche markets and make sufficient revenues to get by, or they will reframe their mission entirely and proceed to help invent the next communication interface.

Do both!

iChat is doing both. It will look for new partnerships with integrators or with vendors in unexpected industries to explore vertical markets and customize its evolving tools.

On the more ambitious front, Busey is extending the iChat platform to support threaded discussions, streaming audio and video, live voice and more. Over time, all the tools will be completely integrated. RealAudio works with the new iChat Pager now, making it relatively simple for someone to broadcast a company announcement that each employee can listen to over RealAudio.

"Our work now is all about bringing people together and allowing them to communicate," says Busey. "For example, if people share common databases, we can tell when they are online, so others can go chat with them. The user interface is very critical."

Reinventing communication software is a surprisingly complex task; it's unlikely that one company can do it all alone. The alliances that Busey builds over the next months will say a lot about his chances for success. We're happy about his new focus; the task needs more minds like those at iChat working on it.

INTRASPECT (DEBUT): WORK *AND* SHARE

Knowledge management is a loaded term. Most attempts to automate or computer-enhance knowledge management have led to software systems that try too hard and get in the way. Some impose too much structure, some have horrible interfaces and some add too many steps to normal work. A few are guilty of all three and other sins we haven't enumerated. Despite early missteps, the field is ready for simple, powerful tools -- especially if they leverage the Net's power and fold into people's normal work patterns and tool kits.

Enter three experienced hands. Tom Gruber, Peter Friedland and Craig Wier have worked in knowledge-related topics for years, including knowledge representation, sharing and acquisition. Gruber led the ARPA Knowledge Sharing effort group on Sharable, Reusable Knowledge Bases. At Stanford University's Knowledge Systems Lab, he helped create the Palo Alto Collaborative Testbed, among many other projects. When the Web hit, he harnessed it early, creating the ARPA Knowledge Sharing Library, virtual document applications and natural-language systems.[5]

Friedland and Wier are no slackers, either. Friedland co-founded IntelliCorp and Teknowledge, then created and led the AI Research Lab at NASA Ames Research Center. Wier's background is in software design for engineering and CAD, with work at Mentor Graphics and ARPA, where he funded human-computer interaction research projects.

Whistle while you work

Credentials aside, the software the three have created for their startup, Intraspect, actually adds great value to work groups without getting in their way. It offers a way for individuals to create and organize collections of related items -- practically any software artifacts, from URLs to e-mail messages, WordPerfect documents and CAD files -- and share them easily with others. Intraspect store some files, but mostly it manages pointers to them and offers a user interface that makes it pretty simple to sift, sort, organize, cluster and publish workday items.

Intraspect's system is well suited to ad-hoc, unstructured work that benefits from an integrated view of a group's resources, or even among work groups in large companies. It becomes extremely useful for answering urgent, random questions: When the ceo calls late at night looking for specific information on competitors, or when someone in manufacturing knows that a sales person saw an answer to a technical problem on the Net. Intraspect helps people create local contexts that, taken collectively, feel like a group memory.

Creating the information collections that form this group memory has to be attractive and useful to people. They have to want to use it. Instead of hiring consultants to create rule-based systems to model a businesses' expertise, the workers can solve the knowledge-management problem themselves as a part of their daily work.

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[5] *We're fans of Gruber's. Four years ago, while consulting to Enterprise Integration Technologies (EIT; now part of Verifone), he created HyperMail, an application we're especially fond of for the way it weaves e-mail -- a communication technology -- together with the Web -- a publishing technology (see* *Release 1.0, 6-95). ARPA is the Advanced Research Projects Agency in the US Department of Defense.*

Topiary or slash-and-burn?

Gruber and his colleagues see the system as a fulfillment of their dreams of enhancing organizational intelligence. Of course, Intraspect uses its own system. "We have 25 people and no employee training program," says Gruber. "A new employee comes in and says, 'What am I supposed to do?' We answer, 'The collective wisdom of the company is over there, in Netscape.' And it sort of works!"

"Gardening" is the task of mulling through documents, presentations, Websites and conversation threads for significant pieces and highlighting them or making them more useful somehow. Intraspect is a power tool for gardeners. In fact, it lets every user be a gardener.

Early prototypes of Intraspect's user interface used dynamic HTML with multiple frames. The team found the interface limiting and redid it in Windows, taking advantage of the added functionality. The first version will ship with a carefully tuned HTML interface; a Java client should be available later this summer. There are many ways of getting information into Intraspect. You can e-mail things to your Intraspect server, which will parse and file it. The server is written in Java.

In February 1996, Intraspect received its initial investment of $3.5 million from AVI Capital and Sippl MacDonald. The system, which debuts at the Forum, will enter beta in late April, with first customer ship expected in Q3.

NETBOT (DEBUT): QUERIES WITH IQ

Increasingly, useful Web information is tucked a few layers deep in database-driven, password-protected Websites that are inaccessible to bookmarks and conventional stored queries. Web robots probably can't find and index that information, either. Barriers such as password checks often protect good information, whether it is about movies, employment, bargains or book reviews.

Seattle-based NETbot has integrated several research technologies it licensed from the University of Washington to create a system that can penetrate those barriers to do savvy searches. Better still, one of the technologies allows the system to launch many searches at once and integrate the results smoothly.

Get a good deal

NETbot's first product is Jango (known as Shopbot in early prototypes), which does comparison shopping across the Web. Put in a CD you'd like to buy, and the Jango will send smart queries to the CD suppliers it knows of across the Net. As the services respond, it will collect them, sort them, remove duplicates and present them to you. In addition, it will search product review and information sites such as the Ultimate Band List in parallel with the merchandise search.

Other potential applications of NETbot's system include the Peoplebot for job searching, people finding and dating; the Newsbot for financial and business news; the Infobot, for vertical market searches; and the Intrabot, to search inside corporate networks. The Intrabot exists; the rest are concepts.

NETbot's ability to distribute queries and integrate the results is similar to the functionality in the WAIS distributed search engine (see **Release 1.0**, 4-91) and MetaCrawler, a search site that queries multiple search engines and aggregates the results. In fact, MetaCrawler is the brainchild of the researchers behind NETbot.

Playing Christo with information sources

Intelligent agents often get a bad rap, but the Wrapper Language that NETbot's inventors created really does make its bots pretty clever. The Wrapper Language lets application developers lock onto a data source, then interpret its interactions, parse its output and deal with it intelligently.

Each query requires two round trips. The first one finds out where on the Net to look by using NETbot's query routing engine (which uses natural language and domain knowledge to recommend places to search); the second one launches the queries and aggregates the results (and aggregate, de-dupe, present them). This meta-knowledge of where to look is critical; lack of it is one of WAIS's limitations.[6] The two-trip process takes time, though, especially because some of the sites to query have to do substantial processing of their own. Nevertheless, the kinds of research one might do with NETbot are usually worth the wait.

When I was but a bot

NETbot is based on five years of research by two University of Washington professors, Oren Etzioni and Dan Weld. The company, which was founded in May 1996, has exclusive license from the University for the technology. Its venture funding is from Arch Venture Partners, Alta Partners and Ohio Partners.

President Eric Zocher was formerly vp of engineering at Adobe Systems, where he oversaw the development of PhotoShop, Illustrator and PageMaker. He also worked at NeXT and Silicon Beach Software. Ravi Pandya, the vp of engineering and server operations, was formerly at Arabesque, which created the Ecco PIM (now owned by NetManage). Before that he worked at the Xanadu Operating Company (a pre- pre-Web attempt to link information worldwide), Hypercube, Xerox PARC and Bell-Northern Research. Keith Zentner, NETbot's director of product marketing, also came from Adobe.

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[6] *OnDisplay's PageAgent (see page 49) emphasizes layout and re-use of tabular information; it also lacks a sophisticated parser and query-routing capability.*

ONDISPLAY (DEBUT): PUT THE WEB TO WORK!

The fact that we can now bookmark Websites that contain tables with useful data such as exchange rates, weather forecasts or driving directions is remarkable, but it doesn't help put that information to work. It's trapped inside HTML tables and bulleted lists, unreadable to applications that could use it. OnDisplay has created a system that can excerpt and use data from arbitrary sites across the Web, turning published, static information into feed for applications.

The first release of OnDisplay's CenterStage is targeted at the corporate developer. It is a powerful application suite for creating automated applications that retrieve, manipulate and present arbitrary Web information for many users at once. For example, the system has conditional branching, so it can display only those exchange rates that have lost or gained more than two percent of their value in the last trading session, or it can average the rates from several sources.

It's easy to imagine workers with domain expertise authoring "zines" that excerpt relevant materials from all over the Web, add value to them and put them into a more useful format than raw Web pages (see **Release 1.0**, 6-95). The zines' external content would be updated automatically. (The zine owners could even use Diffusion's IntraExpress to notify interested parties of significant changes; see page 42)

CenterStage overcomes the constraints that HTML places on the usefulness of Web data for business. It transforms HTML into information that corporations can easily integrate and share with their customers, partners and suppliers.

Features and modules

CenterStage has two major components -- PageAgent Builder and the PageAgent Engine -- that are present in four products: CenterStage Desktop, WebAnalyst, Developer and Server. PageAgents are the programs that run across the Web to retrieve pre-specified blocks of information, then put them to work.

CenterStage Desktop is a standalone version of the system. It offers a pared-down version of PageAgent Builder, the authoring tool, with which ordinary mortals can build PageAgents by selecting portions of Web pages and specifying how they should be presented. It also has single-user versions of the PageAgent Engine and WebAnalyst; it costs $300. The WebAnalyst operates like a spreadsheet on Web data, allowing users to select, store, join and calculate with it ($40 per user).

The CenterStage Developer module offers direct programming of OnDisplay's core PageAgent technology ($1000 per developer). It is tightly integrated with major Web authoring tools such as Microsoft FrontPage, Netscape Composer and Microsoft Visual InterDev.

The multi-user CenterStage Server runs PageAgents across the Net extracting the data elements of interest, then executes the scripts that turn the retrieved chunks into useful Web reports or application fodder (between $10,000 and $40,000). OnDisplay's system enters beta testing at the end of March; first customer shipment is scheduled for June. The first round of funding totaled $3.5 million, from Matrix Partners and Atlas Ventures.

PLACEWARE (DEBUT): BIG CONVERSATIONS

Companies spend an amazing amount of money on training. They produce and distribute videotapes, pay hefty fees for conference facilities and instructors, and fly people to resorts. Existing groupware and videoconferencing systems haven't been good substitutes, especially for large audiences.

PlaceWare, which we described briefly in the January issue, is debuting its company with an auditorium application designed specifically for audiences up to several thousand concurrent participants (see **Release 1.0**, 1-97; also, see the system in the Pods).

Compared to the other conversation tools in the market, PlaceWare's platform is remarkably flexible and scalable. The PlaceWare Auditorium is only a start. Over time, the company will deploy other applications and encourage third-parties to create complementary applications that make use of the PlaceWare platform and APIs. The Auditorium and platform are written entirely in Java.

The view from the bleachers

The Auditorium includes slide presentations, live real-time multi-party audio, Web tours, multicasting, application sharing, security and more. One version of the Auditorium features a plan view of the event space. "Rooms" indicate the topics discussed in them. There's a visual seating chart with our favorite feature: audience voting. Participants can turn their "seat" different colors, depending on how the vote is set up. It's an ingenious feedback device that doesn't interrupt the session.

The Auditorium also has separate moderator and presenter consoles, with extra tools such as slide controls, multimedia support and question-management features. Early on, PlaceWare expects the system to be used mainly for just-in-time training in customer support, product launches and customer seminars.

Public beta testing of the Auditorium will begin in April. HP, Intel and PBS are among its early testers. HP will act as a showcase site. It is using the Auditorium and a Desktop Classroom built using the PlaceWare Platform for its 3,500 front-line customer-support engineers and 350 second-level engineers.

HP's Classroom is highly customized and feature-packed. Participants can chat, add structured turn-taking, show slides, run polls, see who is talking when, use audio and do whiteboard markup. Intel is using the Auditorium to build product demand by creating a series of interactive events in its Mediadome. The most recent event featured Faith Popcorn.

The Auditorium isn't limited to internal communications. It is likely to find great uses for communicating with outside partners or customers, and also for a wide variety of activities for the general public.

The PlaceWare Auditorium is priced starting at $150 per simultaneous user. Special-event pricing is also available to accommodate large audiences. PlaceWare follows the Netscape model of helpful software licensing: The system is free to educational institutions and not-for-profits.

A bovine past

PlaceWare was seven years in the making. It builds on work that Pavel Curtis, Mike Dixon and Dave Nichols did in the early 1990s at Xerox PARC. Curtis is the father of LambdaMOO, one of the most important MUDs[7] and a useful experiment in online social and business life. In an effort to create a distributed, scalable platform, he had been working with Agorics' Joule language, but Joule proved too complex... then the Web exploded... and then Java.

PlaceWare was spun out of PARC as an independent company in November 1996. Richard Bruce, PlaceWare's co-president, spent the past 15 years at PARC, then became ceo of LiveWorks, another PARC spinout, which makes active, connected (hardware) whiteboards. Bruce shares the office of president with Bill Shott, who previously was vp of marketing for NCD's Internet products and is responsible for sales and marketing, as well as PlaceWare's day-to-day operations.

THROW (DEBUT): DO-IT-YOURSELF SOCIAL INTERFACES

Scott Moody, Throw's founder, knows that community thrives on conversation. More specifically, he believes communities are created by people interacting with a common intent -- a phrase we like (it certainly beats the awkward phrase "purpose-centric interaction"). For example, the Advanced Dungeons & Dragons game Forgotten Realms has attracted a large and devoted community that makes impressive use of the Web, text chat and messaging to augment games it holds in real and virtual space. Many other groups are making similar use of the Net.

Intent also evolves. Over time, the roles and relationships in a community can expand, narrow, split off or even reverse. Groups that start out as coffee klatches become online activists or start a neighborhood watch; scientific discussions can spawn experiments, project teams and conference-planning committees. Most existing office work-flow systems and multi-player game environments don't allow for participants' evolving intent.

A straighforward vision

Moody's goal in founding Throw a little over a year ago wasn't esoteric: He believes people need proper tools to build communities, instead of wrestling with technology to make it do what they want. All the Net's conversation tools are disconnected. Moody says, "Real-time tools tend to be graphical and interactive; deferred ones tend to be batch-oriented and plain." And they get pressed into all kinds of service they were not intended for. "It's like using your word processor to maintain your calendar," he says [sorry, Esther!].

Throw's engineers are developing tools to solve these problems, including a community "back office," an authoring application and a Java client. The back office is a robust server running a SQL database. Designers use the authoring application to create community templates of programmable objects, which are defined in Throw's database. The templates create a starting point for a community; they are arbitrarily extensible. This allows the environments to evolve. The goal is to make the process of authoring communities a community process.

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[7] *Just in case: MUDs (Multi-User Dimensions or Dungeons) are text-based multi-player worlds; MOOs are MUDs that are Object Oriented.*

DIY community-building

For example, a company that wants to create a special venue for gardening enthusiasts could author an environment that consists of configurable garden plots or fields, palettes of plants, signmaking equipment, gardening tools and so on. Participants would create their own set of gardens using those tools; the resulting experience would be visual, interactive -- and personal.

At the Forum, Throw will show a prototype golf environment as well as the internal system its developers use -- its own version of groupware in the Internet age. The golf system includes electronic-commerce capabilities. Participants can buy stuff in the pro shop, view catalog pages, hold discussions and get advice from others.

The system Throw uses internally includes many tools essential for keeping the company running, such as a radar screen to track the competition, architecture discussion rooms, a fridge for posting company notices, a bug-tracking system interface, interactive office maps and a workflow area -- all in addition, of course, to a Ping-Pong and darts standings board.

It's easy to envision other applications. Families might enjoy a system that included a trophy case, gift registry and a multimedia family tree. Buy your grandparents a WebTV, give them a password to the tree and editing privileges and let them go!

Throw's system will enter beta testing this summer. Moody expects to have a finished product by the end of the year. Pricing has not been set.

Community access and privacy

This is personal community publishing, with tools optimized for specific tasks, rather than plain HTML. Significantly, anonymity and privacy are built in. Your community can be public, gated or a combination. You can set how members and guests can interact with your space. Perhaps people who have been authenticated can post items, leave new objects or modify your content. Unidentified guests can only read.

The system also offers centralized authentication, so once you have access to one Throw-enabled site you can get to others -- unless they don't want to let you in. Moody plans to add a buddy list feature, though Throw may not create it. In fact, the company will play the role of integrator and offer others' neat tools.

The Throw system can collect data in interesting and unobtrusive ways. It doesn't parse English, so it can't tell when someone complains about a particular product, but it does have different object types, and it can track when people create them and what they do with them. This can generate plenty of useful information.

For example, if a vineyard sponsored live/virtual wine tasting, it might have a shelf with images of the wines to taste. The system could track who tastes which wine. Better still, the wine-tasting "room" could have shelves labeled "love it," "like it" and "can't stand it." Then it could record who puts which wine label on which shelf and perhaps print out a report at the end of the evening for those who never seem to remember which wines they liked. Marketers would like this information as well.

The power of bouncing heads

Three years ago, Moody was at Aldus (now a division of Adobe Systems), studying the social dynamics of ad agencies and design studios in order to develop software to support their work. In particular, he focused on the peculiarities of how creative people interact, plus important features such as management of outsourced jobs and international time arbitrage (in which a job might get passed from New York to Japan so it can be produced by the time New York's staff is back the next day).

Moody wanted to learn about enterprise-scale systems, so he joined Morgan Stanley as an internal technology evangelist. The company was Sun's biggest customer, so he saw plenty of early technology. Shortly before the end of his 18-month stay there, he saw Jim Gosling give an early demo of what later became Java -- when Sun was just thinking about calling it Java. One look at the bouncing-heads demo and Moody knew he had to jump in.

He also wanted to apply the lessons he had learned about work processes and communication. He started Throw with a clear technical vision and little in the way of what message the company should put out, figuring that if he got the product close to finished the rest would sort itself out. In retrospect, he would have done otherwise. Now this nine-person Seattle startup has capable marketers onboard such as Alex Knight and Glenn Northrop, Throw's new president and coo. Moody and his colleagues called the company Throw simply because it is a memorable, active word -- and the domain name wasn't taken.

Selling the idea of community-building software is not easy, particularly when everyone in the market is using the C word, and they're using it in completely different ways. Throw does have a unique and compelling offering, which should serve it well. Over the next few months, it needs to partner with key Web builders looking for additional value to add to their sites and create high-demo-value communities with them.

VICINITY: YOU ARE HERE

If you've used the City Maps or Yellow Pages functions in Yahoo!, you've used Vicinity's mapping engine. This site is a great example of Vicinity's strategy. Rather than trying to become a popular destination site itself, the company wants to help "localize" the Web by licensing Yellow Pages and mapping services to Web publishers. To Hal Logan, the company's president, Vicinity's overarching goal is to increase the selling power of the Web. To that end, it will focus on functions and services that allow buyers and sellers to find each other constructively.

That mission requires reaching more companies than high-visibility Web publishers. Already, half of Vicinity's revenues come from ordinary companies such as Ace Hardware, Blockbuster Video and Rite Aid that want to improve their walk-in business by marketing on the Web. Those companies license Vicinity's BusinessFinder store- and product-locator service, which lets users enter their addresses and be steered -- almost literally -- to the nearest store. The Vicinity system can provide driving directions. (Vicinity geocodes its clients sites' addresses, which isn't trivial. You don't want to send prospective Toyota customers to Honda dealerships.)

It's easy to envision this service moving to smaller and smaller companies. Eventually, Vicinity might let ordinary folks embed maps and driving directions in their party invitations. Its Website already sports a feature called MapBlast that lets visitors create and use a static, custom map.

Origins

Logan became Vicinity's president in June 1996, four months after the company received its initial round of funding from CMG @Ventures. In his prior job consulting to newspapers, telcos and other companies seeking to understand the potential of the Web as a marketing tool, Logan kept running into Rama Aysola, a former manager at Etak, a Menlo Park, CA, mapping company. Aysola was usually armed with a business plan that looked better every time they crossed paths. Finally, the plan found seed funders and Logan was brought in to consult and ended up agreeing to manage the startup instead. He was familiar with the mapping business and its fit with Yellow Pages from his work at Pacific Telesis, where he ran the company's subsidiary, Pacific Telesis Electronic Publishing Services.

Since then, Vicinity has been at work building its network of licensees. Even though Web surfers won't know they are using Vicinity's system, the company can offer advertisers narrowly focused ad buys across the whole network. After all, Vicinity can target by geography better than practically anyone else, and in a Yellow Pages application it can see subject matter, too. It can also overlay objects on the maps -- say, company logos. So if McDonald's wanted to sponsor a mapping capability, the maps it offered would always show the nearest stores.

To get more ad volume, Vicinity is working with DoubleClick and Burst Media; it's in discussions with AdSmart. Over time, Logan wants to extend Vicinity's offerings to supplement each stage of the customer acquisition and marketing process, from generating awareness and interest to trial, repeat purchase and long-term loyalty. Thinking through each element should yield interesting uses for Vicinity's technology.

Renewing the Yellow Pages

Logan continues to think of ways to re-invent the Yellow Pages business, which is highly profitable in print but has to be transformed for the Net. Maps and driving directions are obvious additions, but Vicinity has also created a high-level menuing scheme it calls an Intelligent Ontology. The Ontology categorizes all 16 million business listings into 18 high-level menu categories, each of which expands into 15 - 20 sub-categories. Using the Ontology, users can often get where they want to be with two clicks of a mouse.

Vicinity's Yellow Pages service has many advantages over other Web-based location-oriented services. For one thing, Vicinity uses a proprietary proximity-searching technology to create a directory service that is always centered on the user, as opposed to the town or area-code boundaries that printed directories follow. Online users never have to call directory assistance in the next area code or get the next town's newspaper; it's all in the database.

Vicinity does not store users' locations to make their return visits easier. That implementation detail will be up to the licensee; Vicinity is working with them now to add the capability. Vicinity's system serves over 1 million map views daily; each one is generated dynamically. The system is built around Etak data in an Oracle database.

Other companies and markets

Vicinity is unlikely to tackle phone-system directory assistance soon, even though the market might seem like a logical next step. White Pages listings raise privacy concerns that Logan wishes to avoid, and operator-assisted Yellow Pages offer poor economics, especially if they are unionized. Calls have to be extremely short to be profitable and callers are not willing to pay for the service.

Services delivered via handheld, mobile devices such as souped-up cellular phones and radio-equipped PDAs are somewhat more attractive to Vicinity than directory assistance, but they represent such a small user population that they aren't attractive to advertisers. Also, their small screen sizes mean less visibility for the advertisers.

Vicinity's nearest competitors are MapQuest on the mapping side, and Zip2 on Yellow Pages, but neither has as complete an offering as Vicinity; Zip2 is principally a destination site focused on newspapers. With its strong sense of purpose, good market focus and appealing market opportunity, Vicinity should do well.

WEBFLOW: WORKING (MAGIC) WITH HTML

Collaborative document editing with PCs has always been difficult. WebFlow is using dynamic HTML generation to make the problem more tractable. WebFlow's WebProject is a crisp, useful example of how much you can get done by combining a database and Web technology.

Santa Clara-based WebFlow calls WebProject a project collaboration system. It combines project management features in a task-management module called TakeAction! with collaborative document creation features in the main workspace, which is called SamePage (and which is reminiscent of Broderbund's ForComment and several other document-annotation systems, but implemented completely in HTML). Many things improved between the first and second versions, a span of only six months, including support for Windows NT.

Assemble the pieces

When you import a document to start working on it, SamePage parses it into paragraphs, titles and other work units. (The system is actually built on a similar design that WebFlow founder Steve Tolchin created for the US Army in the early 1980s that broke documents into database records and allowed many people to work on the units concurrently.) SamePage stores the objects separately, then generates the document dynamically, inserting all the added value, including annotations, status marks and so on. Any items can be hidden. Like Lotus Notes, WebProject manages user IDs, their roles and their privileges. But where RadNet's WebShare tries to emulate Notes using Web technology, WebProject is its own concept altogether.

Participants can receive e-mail notification when events occur or portions of a document change. They can even take pieces of the text with them as e-mail, make changes and have them dropped back into the document. The system badgers participants with e-mail reminders when they slip their deadlines.

You can add comments or tasks to any item, then view only the tasks, sorted any way you find practical -- by the person responsible, by deadlines, by completion status and more. The TakeAction! subsystem assigns tasks unique numbers and tracks them to completion. The action items show directly in the document they refer to, or separately, in table-driven reports.

Flexible to avoid disorientation

WebProject has many layers of functionality, which can sometimes seem overwhelming. But it always presents options to pare back the amount of information it presents, making the experience more manageable.

WebFlow's design point is collaboration on documents that are generally exported to more traditional publishing tools such as Microsoft Word, but we're most intrigued by the prospect of using WebFlow to collaborate on creating Websites or Web-enabled documents.

The system's text-editing tools are still rough, especially the editors built into browsers, which is the principal way that WebFlow users enter their text. The next generation of browsers should have far better text editing tools.

You can select many different ways to view a document and its annotations, from annotation summaries to the full threads. You can see only comments from a particular reviewer, or see the document in any intermediate state. You can't automatically approve and add the comments, a feature that Lotus' WordPro has -- though not in HTML.

Conceptually, WebFlow's tools are a level deeper than Intraspect's (see page 46). Work groups could create collections of shared documents and pointers with Intraspect; they could work on the documents and update them using WebProject. We can imagine them launching other kinds of conversation tools (see **Release 1.0**, 1-97) from any spot in a document.

Stephen Tolchin, WebFlow's president and ceo, previously ran HAL Software Systems, a division of Fujitsu-backed HAL Computer Systems that built multiplatform application systems. Prior to that he was vp of software development at Pyramid Technology and cto of NetLabs.

Tolchin, Richard Rebh and Bob Arasmith founded the company in May 1995. They launched WebProject in April 1996. The company now has 40 employees, and its major customers include Sun, JavaSoft, AOL, Lockheed-Martin, Schlumberger, Motorola and Charles Schwab.

WebFlow was started with $4.3 million in venture funding from Bessemer Venture Partners, Information Technology Ventures, Draper Fisher Associates, Draper-Richards, Sippl Macdonald Ventures and others; last October it closed a second round of $10 million from those plus Vertex Management; Canaan Partners; Wessels, Arnold and Henderson; and Asia Pacific Ventures.

The WebFlow Server runs on Sun Solaris and Windows NT. The system costs roughly $350 per user and requires no client-side code beyond a Web browser. WebFlow recently closed a deal with NetFrame to offer its robust servers equipped with WebProject.

ZOOMIT: SIMPLIFYING DIRECTORY MANAGEMENT

Being a system administrator these days can be a difficult, tedious job. Take, for example, one of the trouble spots: directory services (see **Release 1.0**, 4-93). Most corporations have five or more different directories, each with own name space. Each system has its own directory, from file and print servers to databases, PBXes and voicemail systems, PC networks, groupware applications, e-mail and security systems, and packaged applications. The person listed in the POP3 Internet mail server as zoep, is in the Banyan Vines directory as Zoe_Person@Marketing@ Corporate, the PeopleSoft HR system as Zoe Person and the X.400 mail server as:

C=nl;A=400net;P=surf;OU=RC;OU=PO;OU=netwerk;S=Person;G=Zoe

When someone changes jobs or leaves a company, all the directories have to be updated and they inevitably get out of synch. Automatic synchronization among directories is still out of reach. Besides, most directories don't contain the same information. The file server doesn't care what your phone number is; the PBX doesn't need your e-mail address -- not yet, anyway.

One of the goals of Windows NT is to unify this through NT common services, but Microsoft does not yet field a directory; Novell is staking its business on NDS's success, but it isn't clear how far it will get.

Toronto-based Zoomit has developed a sophisticated meta-directory called Zoomit Via that can examine and manage a variety of popular directories, keeping them all synchronized. Need to change someone's e-mail address? Change it in Via, and it will be reflected in the cc:Mail post office and the NDS server.

Zoomit's premise is simple: These directories aren't going to speak to each other easily soon, nor will companies be able to herd all of these data items into a single super-directory that can talk to the many applications. (Besides, candidate super-servers such as NDS don't scale to the point where they could do all that they claim they want to do.) Administrators need a meta-directory that creates a unified view of all the directories and offers powerful management features. Sounds like a market to us.

Beyond directory synch

Zoomit was founded in 1988 to build custom directory-enabled messaging gateways -- effectively directory-synchronization products. Anand Bahl, Zoomit's president, was previously at Bell Canada, Moore Business forms and the Canadian Pacific Railroad; Kim Cameron, the cto, taught at George Brown College in Toronto. The two met while troubleshooting a PC problem in 1982 at George Brown, where Bahl managed all systems and programming and Cameron was the director of academic computing at the time.

Zoomit shipped its first product, Enterprise Directory Management Services, in 1992. Zoomit Via creates a unified and interrelated view that offers administrators comprehensive access and management of directories in a variety of systems. It doesn't collect and superset information from all the other directories. Instead, it points to them and keeps unique information locally. The relationship is bidirectional, which means that if someone makes a change to one of the directories Via manages, the change will be reflected in Via.

The Via system has considerable intelligence. It learns about patterns that administrators repeat often; it also cleans and corrects itself. It offers drag-and-drop administration and lets users find, read and post to the directories. In fact, network administrators can add their own fields to entries in Via, enhancing the data-storage capabilities of all the other systems. Via also features strong security (it piggybacks on existing security systems and uses X.509 certificates) and support for the Lightweight Directory Access Protocol, which has become a unifying force for Net directories.

To do all of this, Zoomit's software engineers created the "D" directory data flow language, which lets administrators do "join" operations among disparate directory servers. They call it the Complete Join.

Agents do the work

Via can manage directories in the Netware 3.1 Bindery, Banyan vines, Lotus Notes, Lotus cc:Mail, Microsoft NT Domain Controller and Microsoft Exchange. It also allows for custom management agents to work with other directories, such as those in SQL-accessible human-resources applications. Each directory requires a management agent (much as NETbot, page 47, uses its wrapper language to work with information sources).

Via is designed to help with directory migration, which causes many a headache. A company that needs to import its Novell Bindery entries to a new human resources database, then move the e-mail addresses into Exchange would benefit from using Via. The system is useful to others besides system administrators. End-users can store software objects in Via for others to find and use. For example, you might put pictures on your name listing or presentation files next to your product title.

The base Via product costs $2500 and supports 250 users and two management agents (e.g., for Notes and Netware's Bindery). Every 250 additional users cost $2000; additional management agents are $1000 each.

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